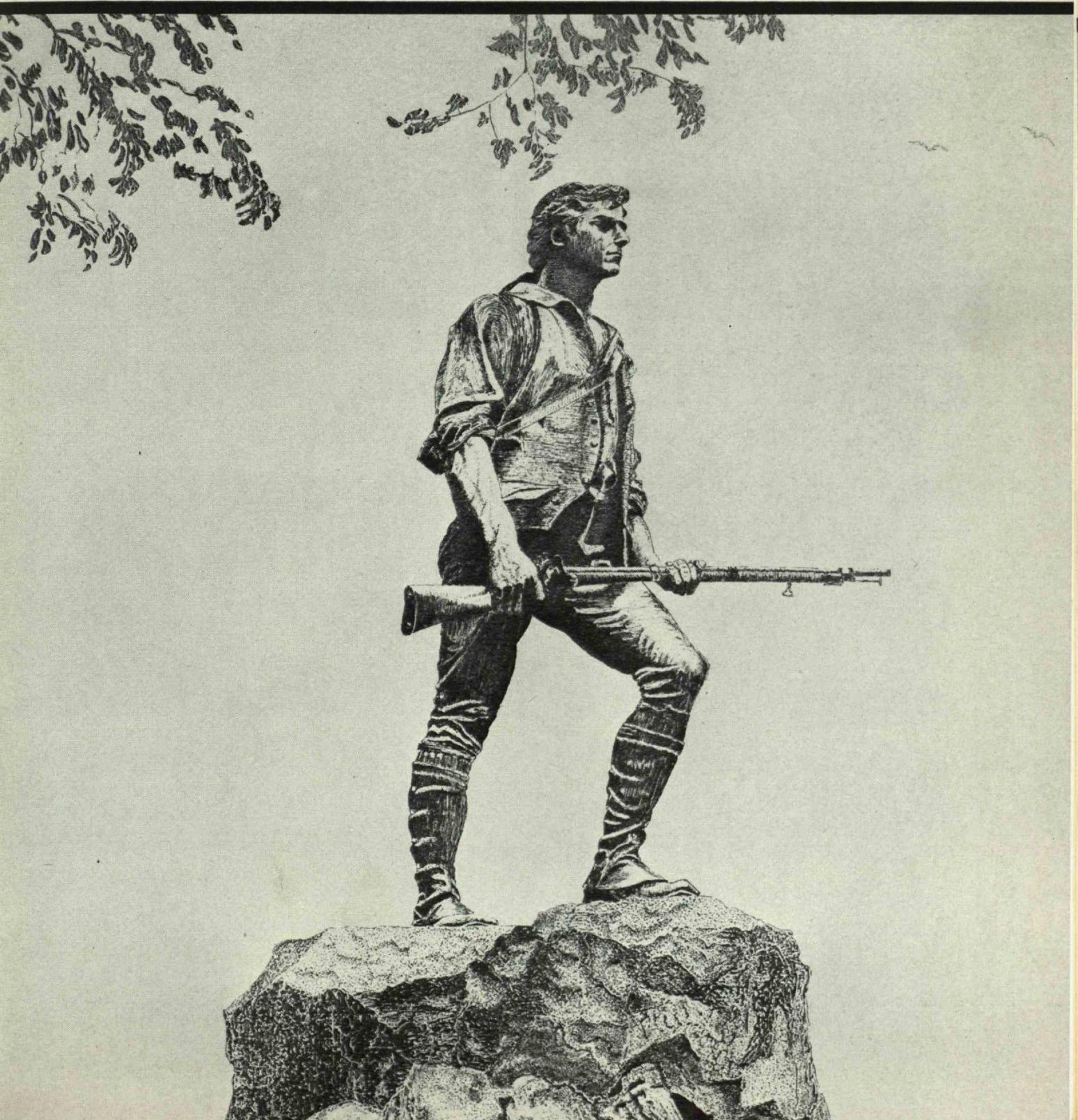


April 1948

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology review

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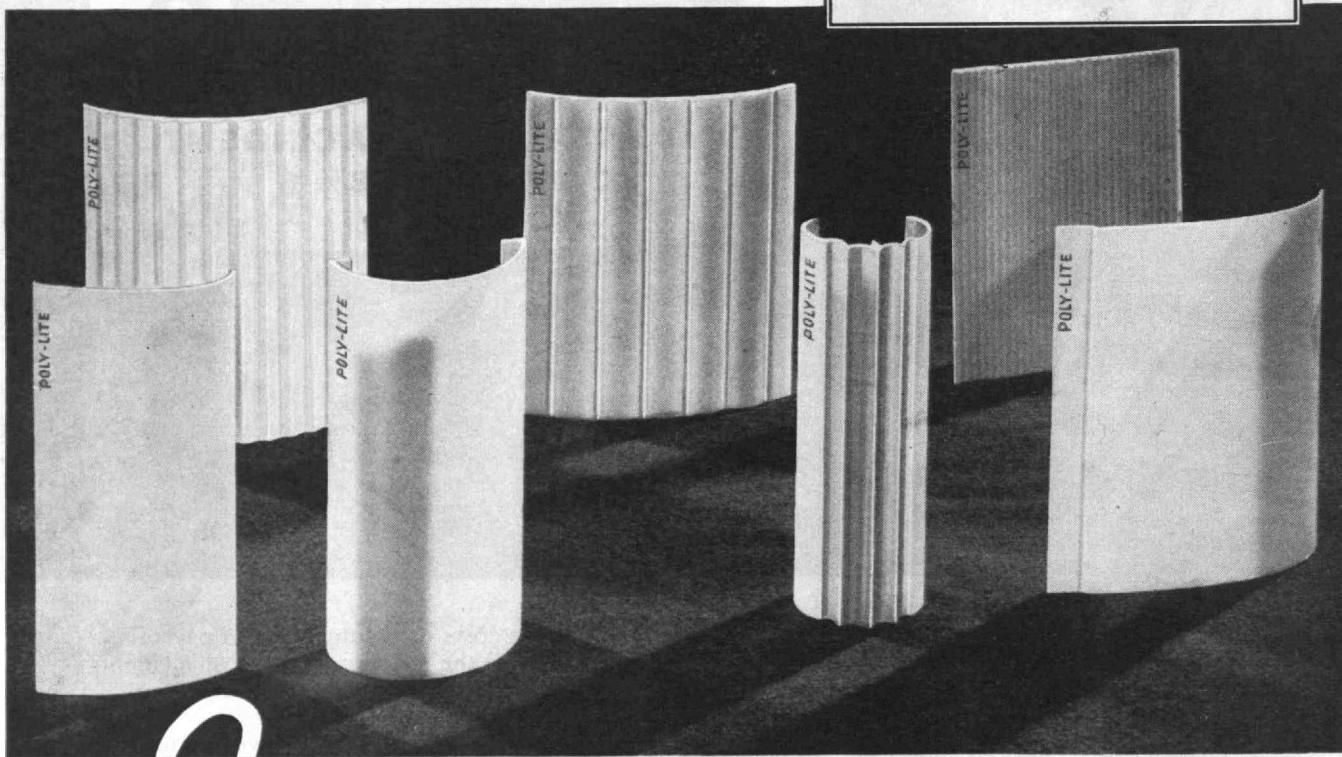
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11. Color	—Unlimited
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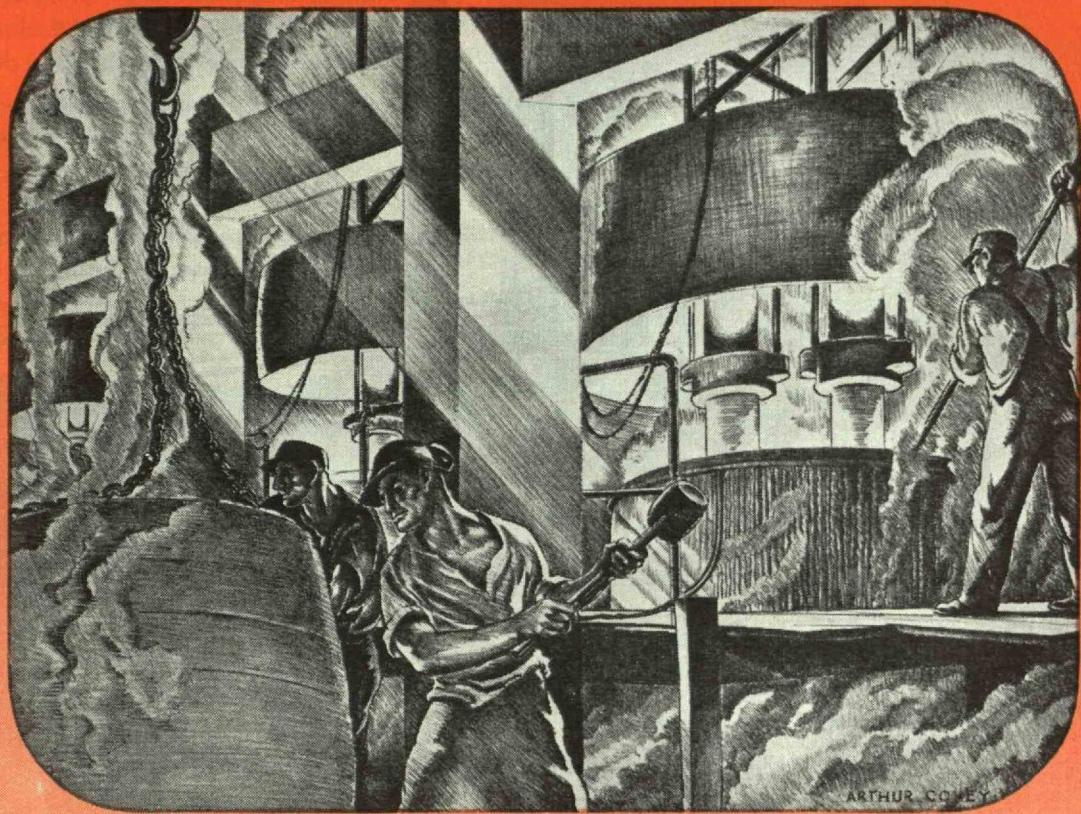
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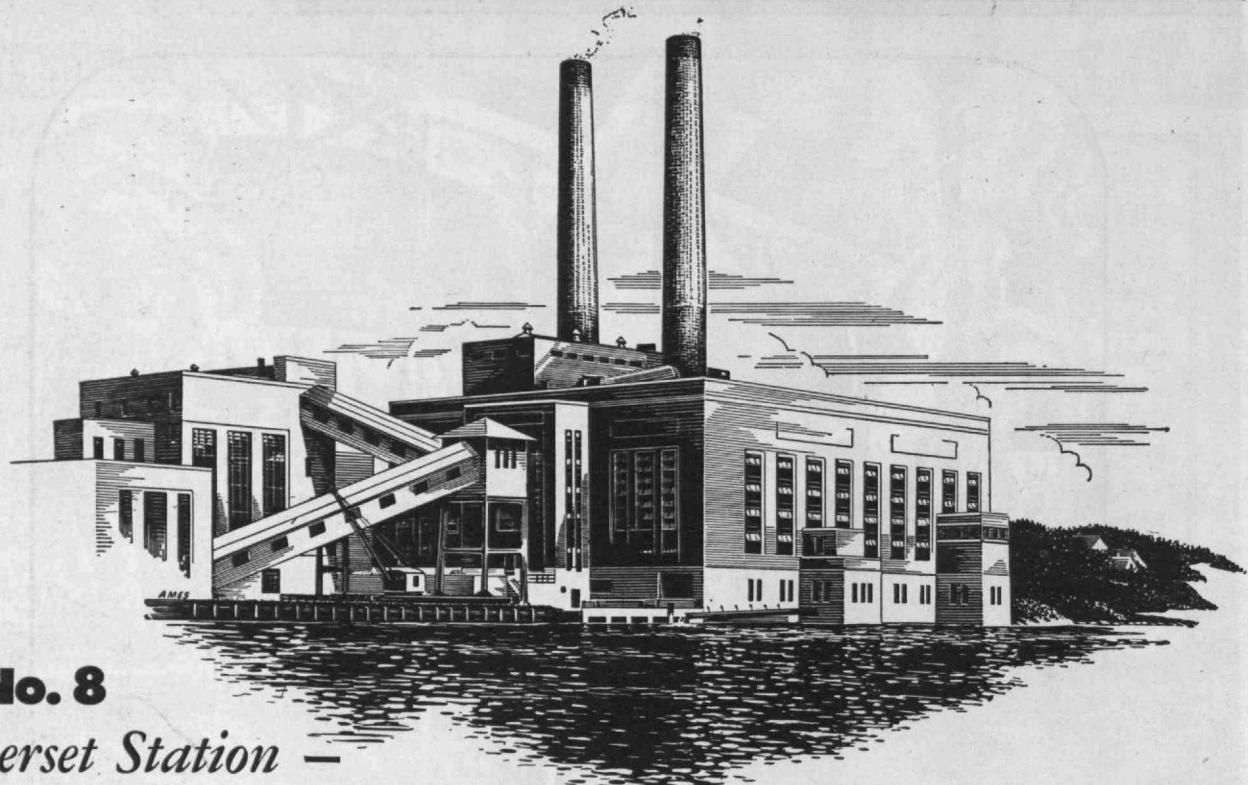
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No. 8

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This drastic departure from conventional practice — watched critically by leading power engineers everywhere — required courage, because of the large financial risks, and engineering competence of a high order to solve the many technical problems. That Combustion Engineering, designers and builders of the boiler, the Montaup Electric Co. and their consulting engineers, Stone and Webster Engineering Corp., solved these problems has been demonstrated by the boiler's performance record over the past five years. Not only is it one of the most successful big boiler installations in the country, but it has proved that *forced circulation* affords important operating advantages for large power stations.

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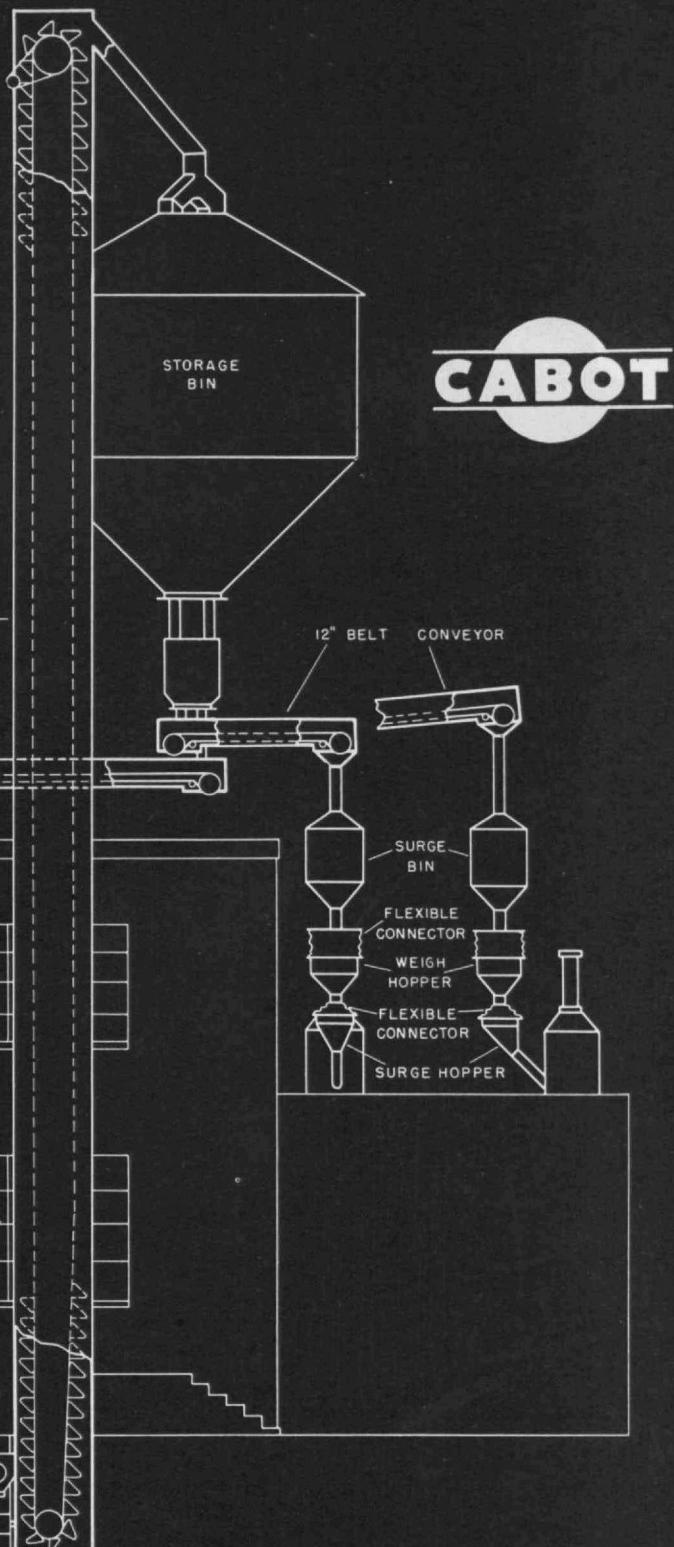
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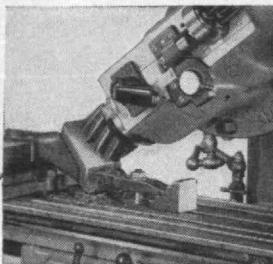
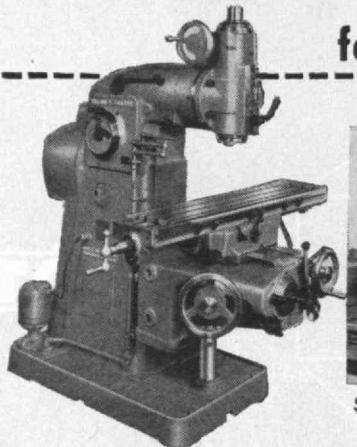
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Write for Bulletin S-4611

HAROLD E. KOCH '22, President

ELTON E. STAPLES '26, District Manager, Cleveland

THE TABULAR VIEW

Minute Man. — The pen-and-ink drawing of the Lexington Minute Man, which graces The Review's cover this month, appropriately commemorates the events of Lexington and Concord in April, 1775, when "embattled farmers . . . fired the shot heard round the world." The appropriateness of the April cover is further enhanced by the fact that it was executed by able artist SIDNEY L. KAYE, '30.

Workman's Slant. — Well known to Review readers for his able commentaries on the social effects of modern industrial life, Dr. Paul Meadows attempts to answer the question "What's on the Worker's Mind?" (page 322) by a descriptive summary of public opinion polls, chiefly those of Roper, Gallup, and polls reported in *Public Opinion Quarterly*. Dr. Meadows is associate professor of sociology at the University of Nebraska.

Revolutionary Mathematician. — The story of Évariste Galois is that of a brilliant Frenchman whose outstanding mathematical work was prematurely ended at the age of 20. The biography of this unheralded mathematical genius is ably recounted (page 316) by DAVID AND CHARLOTTE B. LANDAU. The Galois biography is the product of a happy collaboration of an engineer, specializing in stress studies and elastic theory, and his wife, a teacher and writer on scientists and scientific matters, who is, as well, a graduate in science from French schools.

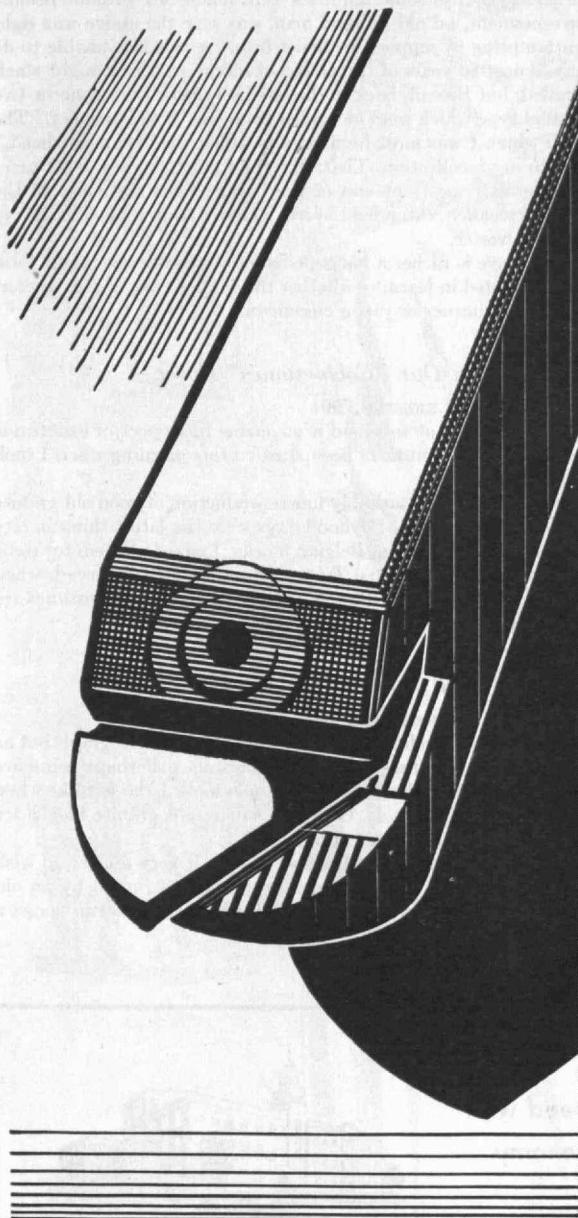
Daily Hibernation. — Any interested observer is able to determine by experiment the individual factors which go to make sleep such an important and pleasant part of our daily lives. To such lay observations the authors of "Ah, Sweet Mystery of Sleep" (page 319) add a distinctly professional touch. DR. M. F. ASHLEY MONTAGU, already known to Review readers through his articles on matters relating to medicine, is associate professor of anatomy at the Hahnemann Medical College and Hospital of Philadelphia. He is assisted in his professional work by coauthor EDWARD MILTON, member of Harvard's class of 1933 and a former major in the United States Army.

Quantitative Biology. — Perhaps the "numbers racket" does not exactly come to the aid of workers in the agricultural sciences, but something akin to it is a most valuable aid to the worker in the biological sciences. Indeed, FREDERIC W. NORDSIEK, '31, shows (page 313) that progress in modern biological sciences would be much impaired without benefit of statistical analysis. Mr. Nordsiek is assistant to the director, Department of Applied Research, Standard Brands, Inc.

Wright Era. — Comments on the quiet, modest life and methodical working habits of Orville Wright, whose recent death closes a bright chapter in American initiative, are given (page 309) by genial FRED C. KELLY, close associate with the Ohio inventors. In Review articles, as well as in the volume *The Wright Brothers*, Mr. Kelly has told the story of two modest inventors.

HEVI DUTY ELECTRIC COMPANY
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- A.** For about 15 years.
- Q.** Why are molybdenum high speed steels preferred to 18-4-1 by many large consumers of tool steels?
- A.** They're tougher. Do a better job for less money. They're from 10¢ to 20¢ a pound cheaper. In addition, the molybdenum steels have from 6% to 9% lower density, so if you make your own tools, you get more tools for a given gross weight.*
- Q.** Where are users finding molybdenum high speed tool steels superior?
- A.** In twist drills. In hacksaw blades. In milling, slotting, and slitting saws. In taps, chasers, broaches, reamers, hobs, milling cutters, lathe and planer tools. Can be used for all classes of high speed tools with good results.
- Q.** Is there any special trick needed in heat treating molybdenum high speed tool steels?
- A.** No. In modern furnaces, molybdenum high speed tool steels are as easy to harden properly as 18-4-1. And they cost much less—and save money on the job.

*Our booklet on molybdenum high speed steels will give you proof of these statements. Write for it.

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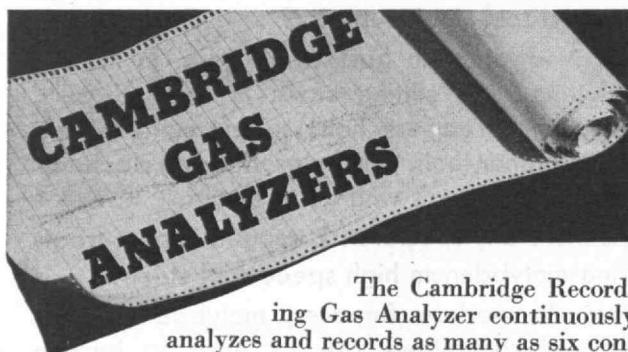
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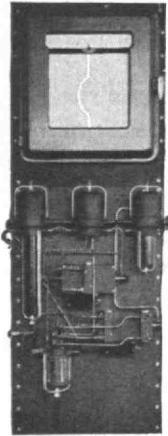
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MAIL RETURNS

Stacks—Straight and Flaring

FROM EDWIN C. SMITH, '91:

In the picture of the "Last Spike Ceremonies" (page 264), one locomotive is shown with a straight stack and one with the flaring funnel type. In my mind the funnel-shaped stack has been associated with the old "wood burner" while the straight stack was the hallmark of the coal burner. Recently, some inquiries were made but without results. One correspondent, an old railroad man, was sure the above was right but on attempting to support his belief from records was unable to do so. In my almost 80 years of travel and observation, the straight stack has prevailed, but I recall, back in the late 'Seventies seeing one or two of the funnel type which were identified to me as "wood burners." The stack with which I was most familiar was called the "diamond head," according to my recollection. That, like the funnel stack was set practically at the extreme front end of the boiler. Then the body of the boiler was, as recalled, extended to form a cinder trap, replacing the old screen spark arrester.

Now, the above is rather a hodgepodge of old recollections but I am fatuously interested in learning whether the funnel type was characteristic of the wood burner or just a circumstance.

Providence, R. I.

On Our "Cobblestones" Cover

FROM MARSHALL O. LEIGHTON, '96:

Were The Review not so sound a magazine in respect of exactitude of expression, I would not have been startled this morning when I took up my March number.

The cover exhibits a remarkably fine reproduction of good old granite paving blocks, which in my boyhood days were the latest thing in city street paving. We called them Belgian blocks. I gazed at them for some time amid nostalgic sentiments. To my astonishment I observed, when I reached page 255, that the title was "Cobblestones." Cobblestones are natural rounded stones large enough to be used for paving.

Washington 5, D. C.

Well, Then—We Are Young!

FROM WILLIAM C. PICKERSGILL, '00:

The cover of the March issue is a very interesting photograph but as you undoubtedly know these are not cobblestones. Perhaps some are too young to remember what real cobblestones looked and felt like when riding over them on a bicycle. Good old square-cut granite blocks are a luxury compared with a real cobblestone.

This is not a criticism of The Review. I enjoy it very much and wish you all success. It may be just a memory brought to mind by an old photograph of some '99 and '00 boys which I happened to run across a few days ago.

Newton Highlands, Mass.

Speed with
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Bilkuber-Knoll Corp.

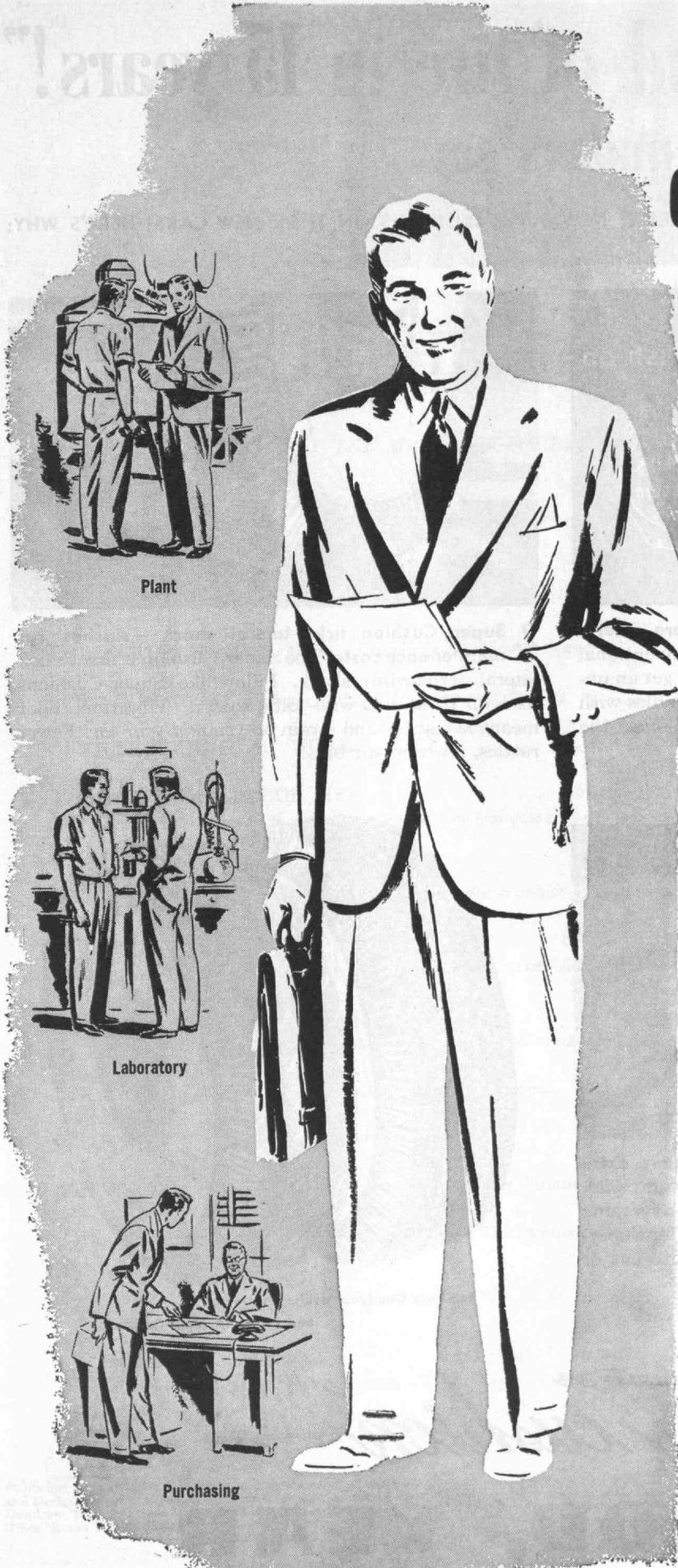
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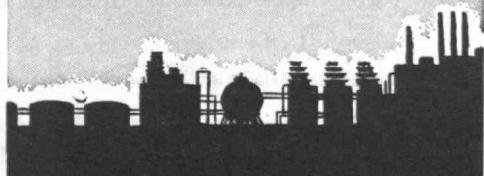
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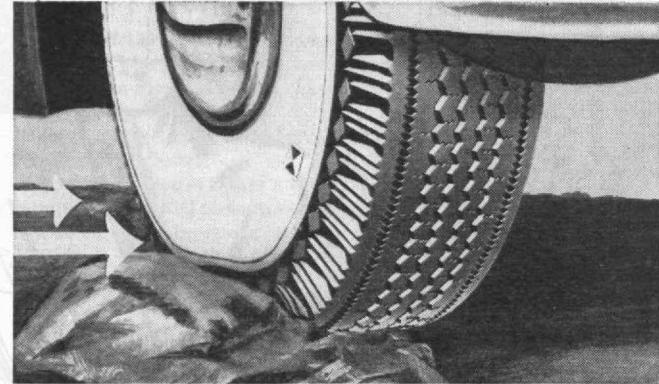
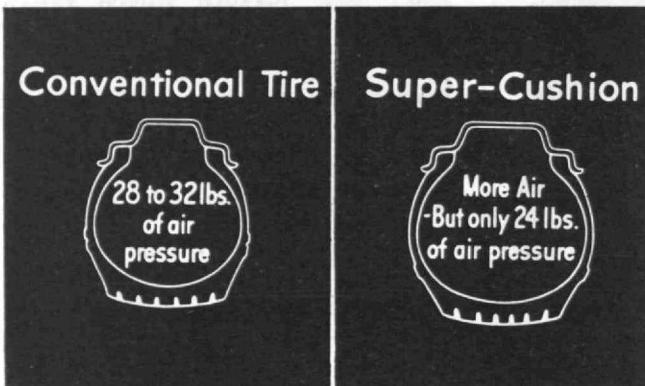


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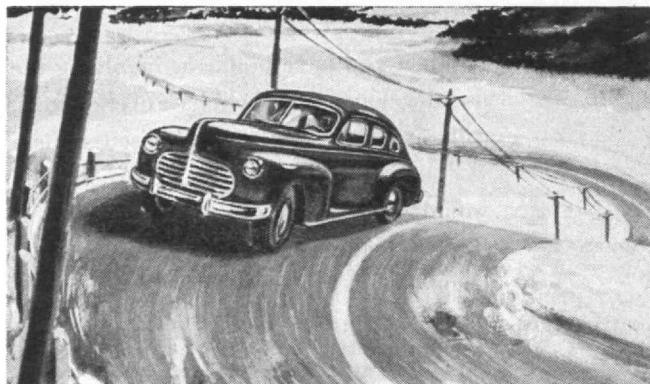


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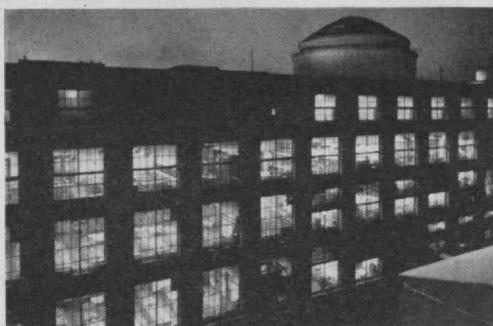
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THE TECHNOLOGY REVIEW

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H. Armstrong Roberts

Spring Plowing

THE TECHNOLOGY REVIEW

Vol. 50, No. 6

April, 1948



The Trend of Affairs

Orville Wright at Work

BY FRED C. KELLY

ORVILLE WRIGHT'S greatest pleasure, to the end of his life, was in his work. Less interested in benefiting from what he found out than in satisfying intellectual curiosity, he continued to be an inventor. He spent every day, usually including Sunday, at his office and laboratory which have been dismantled since Mr. Wright's death. The place was a one-story building at 15 North Broadway on the west side of Dayton, about four miles from his home and within short walking distance of the site of the Wright bicycle shop, where work on the airplane started. The front of the office building was suggestive of a village bank. There were two rooms in the office part — one a sort of reception room, severely furnished. Back of this room was an immense fireproof vault containing the voluminous Wright archives of scientific work covering a period of nearly 50 years. Across a small hallway was the office workroom. The whole place had a working atmosphere, with nothing about it of coziness or comfort such as a man in retirement might want if he were seeking only a place in which to loaf or put in his time.

Back of the office part of the building, a few steps down, was to be found the laboratory, a fully equipped machine shop, 40 by 60 feet. Here Orville Wright devoted himself to whatever scientific project claimed his interest. It was here that he invented the split-wing flap.

As faster, more powerful, planes were being designed after World War I, there was need of means for slowing them down when making landings. Orville hit on the idea of the split-wing flap, the performance of which he first demonstrated in his small wind tunnel in December, 1920. He was able to prove that by lowering a flap — part of the wing surface hinged along a line several inches forward from, and parallel to, the rear edge — a pilot could increase the wind resistance of the wing and retard the speed of the machine. Through the Dayton Wright Com-

pany, Orville offered the invention to the United States Navy in April, 1921, although he did not patent it until May 21 of that year. By July 15, 1921, the Dayton Wright Company was offering a plane, that included the invention, to the United States Army. But neither the Navy nor the Army made any use of it for some time. In its issue of August, 1935, the *Journal of the Royal Aeronautical Society*, in Great Britain, commented editorially: "A patent for a split traveling edge was granted to Orville Wright in 1921, and it would be interesting to know why it was neglected for ten years or so."

Not all Orville Wright's inventions, many of which he has never even bothered to patent, have to do with aviation. Recently, he devoted much time to the perfection of a machine for writing and translating cipher codes.

A person would have been fairly safe in setting his watch by Orville Wright's arrival at his office in the morning, as punctually at 8:30 as if he had to punch a time clock. And he was equally sure to return from lunch, which he nearly always ate at home, at exactly 1:30.

Unseeing Eyes

THE concept of micro-organisms as causes of disease at first seemed so improbable that the germ theory of infection was doubted in some quarters until well into the Twentieth Century. How much greater a challenge to the human imagination, then, was the idea of a submicroscopic parasite that preys upon microscopic bacteria. Such a parasite is bacteriophage, first announced by d'Herelle a quarter of a century ago. In 1925, Sinclair Lewis capitalized on the dramatic nature of bacteriophage by making it the research subject pursued by the hero of his novel *Arrowsmith*. Phage was soon found to be an important element in the balance of nature, as for example in the destruction of bacteria in heavily polluted waters, and phage also developed economic significance when it proved to be the cause of previously unexplained difficulties in certain industrial fermentations.

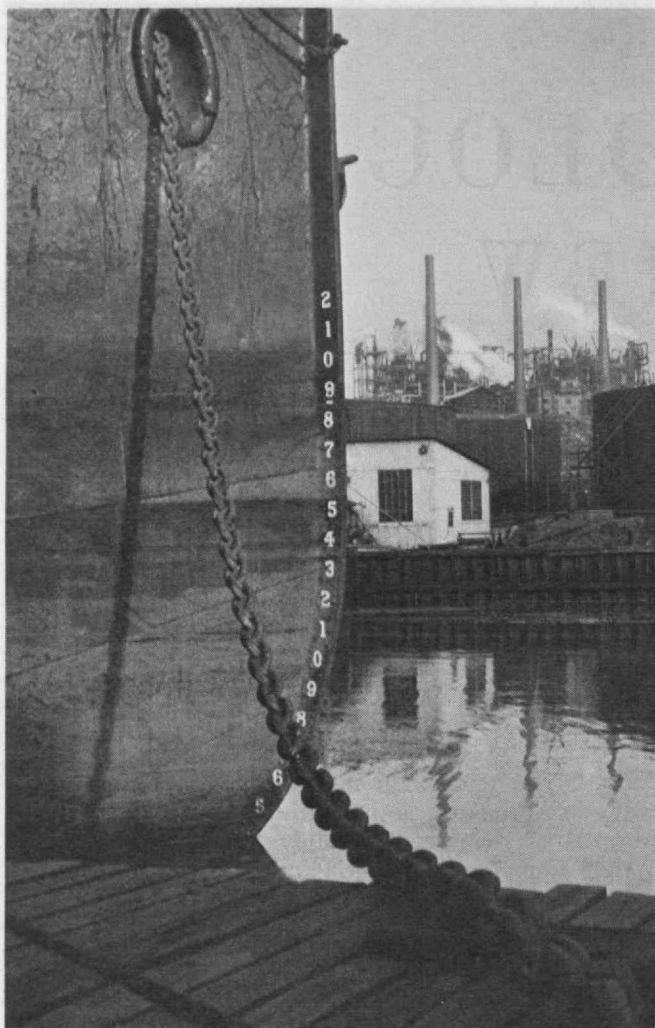


Photo by K. H. Strelou from Black Star
Great Lakes boat anchored in Cuyahoga River

D'Herelle's pioneer work with bacteriophage was soon confirmed by other workers, although this subsequent research was done by studying only effects, without observation of the phage itself. Since bacteria come close to the limit of visibility afforded by the compound microscope, the best optical instrument available at that time, a search for entities still smaller than bacteria seemed pointless. But fortunately biologists are accustomed to studying effects of agents without coming to grips with the agent itself; thus much of the work with vitamins, hormones, and enzymes was, and still is, done in such terms, by working with more or less crude concentrates, but with no conception of the nature of the active substance involved. As the study of bacteriophage progressed, a theory gained some acceptance to the effect that it was enzymic in nature, rather than being an organized entity as postulated by its discoverer.

Then invention of the electron microscope pushed the range of human vision beyond its previous barrier, the wavelength of light. By 1943 bacteria under attack by bacteriophage had been observed extensively under the electron microscope, and were seen to contain particles not present in other bacteria, particles that logically were assumed to be the phage. The electron microscope, however, can be applied only to stationary objects, and therefore when used to study microbes it is limited to observation of dead and fixed preparations. Therefore, the

conclusive stage of this research had to await development of the phase microscope, which shows objects as minute as does the electron microscope, but permits observation in the living, active state. Brought to bear upon bacteria affected by phage, the phase microscope revealed that the particles previously seen under the electron microscope pass through an interesting chain of events. They increase in size as they approach the victim, and the bacterium under attack becomes immobilized. The particles then attach themselves to the bacterial cell, briefly diminish in size just after attachment, then increase in size. The bacterium bursts, releasing the flow of its protoplasm, and finally new particles, like the original ones, develop within the liberated protoplasm. These observations showed beyond doubt that the particles are surely bacteriophage, thus giving the quietus to the enzyme theory by establishing the phage to be an organized entity, withal necessarily different from life as we know it.

In the light of these advances, preparations of bacteria infected by bacteriophage were studied intensively under the ordinary compound microscope, which provides magnifications up to some 1500 diameters, but no higher. Special staining techniques were developed to delineate the bacteriophage. With these stains, all of the stages of phage attack just described became clearly visible. Contrary to the long-held belief that they were submicroscopic, it is now clear, therefore, that bacteriophage is clearly visible under ordinary microscopes, provided the observer knows how to look and what to look for.

This discovery stimulated a re-examination of d'Herelle's original publications. Startlingly enough, these papers revealed that he had observed bacteriophage under the ordinary microscope in the early 1920's. Subsequent controversy about the nature of bacteriophage had apparently obscured this pronouncement. Thus, in a by-no-means unprecedented fashion, a well-articulated, early discovery was ignored, and lay fallow until other advances — in this instance, invention of the electron and phase microscopes — had conditioned the scientific mind to its acceptance.

Roll out the Barrel

A CONTAINER widely used today that is still made exactly as it was in ancient Egypt is the wooden barrel. Prime advantage of the barrel is its extraordinary strength; this characteristic inheres in its shape, which is that of a doubly truncated ellipsoid. Since most of the barrel's walls are therefore spheroidal in contour, they possess the great structural strength of the dome or multidirectional arch. Another advantage of the ellipsoidal shape is that the wooden barrel, when lying on its side, the proper position for moving, makes a virtually single-point contact with the floor. It is, therefore, almost as mobile as a sphere, but is easier to guide than a sphere because of its elongated shape.

Any cooper would shudder to hear the reference just made to the "side" of a barrel, for to him this area is known only as the "bilge." Among other esoteric, withal euphonious, terms stemming from the antiquity of the cooper's craft are: croze, chime, howel, huckleback, and cant; meaning, respectively, the groove near the ends of staves into which barrel heads fit, the section of staves between the croze and the end, the portion of the stave

that is grooved to make the croze, an untrimmed stave, and the outside piece of a multiple-piece barrel head.

Wooden barrels are of two broad types, tight and slack. Tight barrels are used for liquids, syrups, oils, greases, and similar substances requiring a fluid-tight container. Slack barrels are not liquid-tight: they are used to hold multifarious materials ranging from fresh fruits to nails and spikes, and when fitted with a sift-proof liner, are used for dry powdered products, such as dry-milk solids or powdered detergents.

Since the various plentifully available domestic woods have a wide array of physical properties, barrels may be made with correspondingly varied characteristics, to adapt them for specific uses. Thus, whisky barrels are made of quarter-sawed white oak, syrup barrels of gumwood, fish barrels of ash, and so on. Illustrative of the extreme versatility of this container is that wine barrels have the porosity necessary for the "breathing through the wood" considered by vintners to be essential in the maturing of wines, whereas beer barrels are able to hold a carbonated fluid under considerable pressures.

Use of cooperage through the centuries has given rise to complex and sometimes confused systems of units for materials packed in barrels. Today barrels are made in many sizes, but when currently spoken of as a unit of capacity the barrel usually designates some 30 gallons. In general, a hogshead has twice the capacity of a barrel, a pipe, twice the capacity of a hogshead. The tierce, a barrel often used for shortenings and lard, is one-third of a pipe (literally tierce means a third), so that the tierce is intermediate in size between the barrel and the hogshead. Although in recent decades little flour has been packed in barrels, the long-established (and still currently used) unit of flour weight is the barrel of 196 pounds. This odd weight derives from the fact that capacity of the flour barrel was originally set at 14 stone, the stone being an ancient and once variable weight unit, finally standardized by British law at 14 pounds.

To you, "pork barrel" may mean political patronage, but to the cooper the pork barrel is an important and rigidly defined item of his wares, made of 9/16th-inch oak or ash, planed inside and out, with heads having not more than six pieces and no cant under three inches in width, supplied for packing salt pork and similar cured meats.

Mysterious Work Horse

MOST hard-working and most versatile among the many industrially important enzymes is invertase. Enzymes are biological agents that act like catalysts, to bring about changes or reactions without being changed or used up themselves. Enzymes are valuable in industry because they often can produce effects at neutrality and at moderate temperatures, effects that could be produced by chemical means only with extreme acidity or alkalinity and high temperatures. Furthermore, the specificity of enzymes is useful, since in general they attack only their particular substrates. Thus, an enzyme mixture widely used for desizing textiles vigorously breaks down both proteins and starches in the sizing, but does not in the least affect the textile fibers, whereas any chemical that could accomplish the same purpose would also attack the fibers.

Invertase is versatile in its applications, not in its functions, because it does just one thing: it divides the mole-

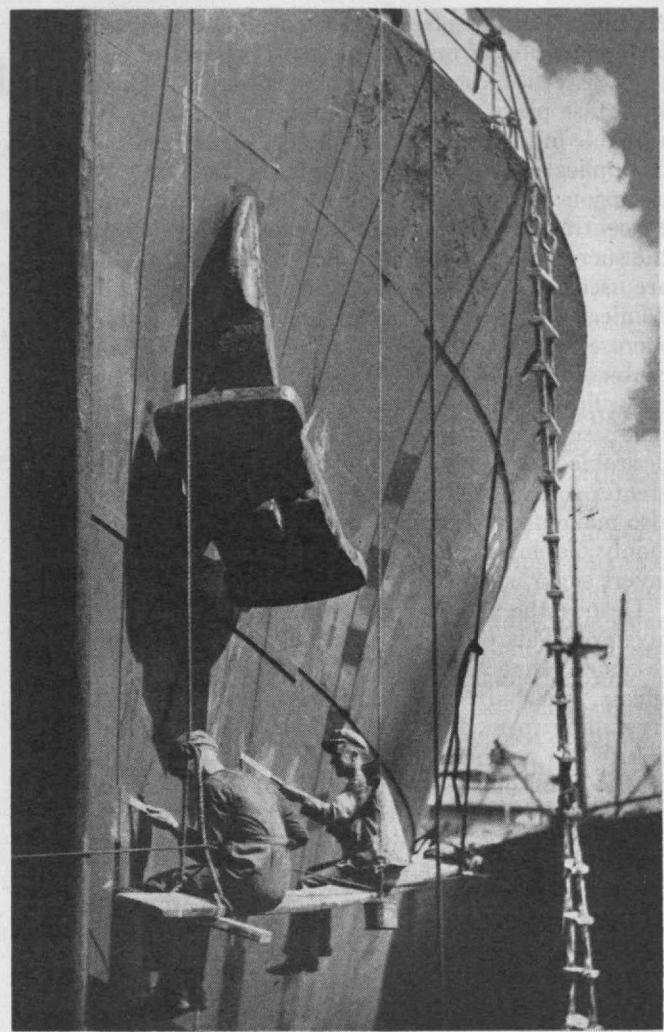


Photo by William M. Rutledge

In dock for cleanup and repairs

cule of sucrose (common cane or beet sugar), adds a molecule of water, and thereby produces one molecule each of the simple sugars dextrose and levulose, a mixture known as invert sugar. This change, called inversion, is part of the metabolism of many different types of living things, as demonstrated by the widespread occurrence of invertase in nature. In the human being invertase is found in the intestinal digestive juices, where it serves to invert any sucrose in the dietary not previously inverted by the acidity of the stomach juice. Sucrose must be inverted as the first step in its assimilation, since it cannot be absorbed, whereas both dextrose and levulose can. Invertase also occurs in molds, in bacteria, in the stems, leaves, blossoms, and fruits of higher plants, in the blood and eggs of invertebrates, in primitive animals, such as jellyfish, in the saliva and intestines of honeybees, and in the tissues or body fluids of birds and of higher animals other than man. By far the richest natural source of invertase, however, is yeast.

Technological uses of invertase include laboratory applications for preparation and isolation of certain sugars, and as a reagent in the quantitative assay of sugars. Invertase also is involved in all industrial fermentations where alcohol is produced from substrates containing sucrose, as invert sugar is fermentable, whereas sucrose is not. This means that invertase enters into the production of alcoholic beverages, as well as of industrial alcohol.

An important but often unrecognized ramification of this latter function of invertase is the inversion of sucrose in yeast-leavened doughs for the making of baked foods. Invertase plays a role in the malting industry. It also is valuable in the production of invert sugar for use as such, in applications where the ordinarily cheaper method of inversion by acid and heat is not practical. In certain concentrations invert sugar is considerably sweeter than the sucrose from which it is derived, so that where sugars are used for the sake of sweetness, inversion may be economical. Furthermore invert sugar is more soluble than sucrose; thus invertase may be used in confectionery centers prepared from sucrose that are hard and firm when first made and thus can easily be handled for operations, such as chocolate coating, but later develop a desirable softness by invertase action and because of the greater solubility of invert sugar. The paper industry can also make use of invertase because invert sugar is a commonly employed plasticizing agent. The levulose half of invert sugar is the one with plasticizing properties.

Despite the wide use of invertase, its nature remains a mystery. This of course is equally true of all the other enzymes. Some 200 enzymes have been identified by their effects, but only eight of them have been isolated in crystalline form, and even of these eight the chemical nature has not been established conclusively. Thus a recently published monograph about invertase examines over 400 references on the subject, but is unable to extract from these a definite answer as to either the nature or mode of action of invertase. But despite its aura of mystery invertase remains a most productive industrial work horse.

Flying Salesman

FOLLOWING a war, there have been marked advances in techniques of salesmanship stimulated either by war-developed techniques or the pressures of competition. After the Civil War, for example, the development of the railway created the national salesman known as the

drummer. The post-Spanish-American War period saw the introduction of the quota system, the telephone, and the standardized sales argument. After World War I, marketing research techniques using the Hollerith punched card were introduced, and the automobile became an important vehicle for salesmen.

Now, following World War II the airplane has rapidly risen to prominence in selling. Perhaps the chief patrons of commercial air lines are business executives and salesmen. But in addition the airplane has become as familiar to sales staffs as Pullman cars or automobiles of prewar days.

The flying age in selling is here in a new and startling fashion. The salesman who drives his own plane and even calls on customers by landing on company airfields alongside the factory is no longer a rarity. Entire corps of salesmen operate their own planes, and sales executives often own their own planes in which they visit branch offices. And of course executives who visit branch plants, call on principal customers, or drop down to Washington to see a government official are no longer to be numbered merely by the dozen but by the hundred. When it is realized that an hour of an executive's time may be worth \$100 to \$500, it is easy to see that there is a real opportunity for the company plane or planes, with a company pilot and a systematic, planned use of their modern time annihilator to speed up selling operations.

Nor is this all. Demonstration planes, equipped with the firm's products on display, can speed around the country, or even out of the United States, as some companies are now doing. District sales meetings, operated by a crew which travels via such planes, or traveling displays open to customers, who are delighted with the novelty of visiting an exhibit on a plane, are among the interesting possibilities. But the unexpected possibilities, such as high-speed delivery of a heavy machine or special part, for example, make a favorable impression on customers and outspeed a competitor. The flying salesman is a fixture already in our technology and has quietly and characteristically become a part of our daily lives.



Pritchett Hall, on the second floor of Walker Memorial, has recently been completely remodeled and redecorated as a student lounge and milk bar. Conveniently available to all Institute buildings and activities, the new lounge provides a congenial recreational center where students may entertain their guests or enjoy refreshments during the evening. The serving counter is at the extreme right in this picture, although all but the entrance is removed from view by the vertically striped screen.

The Mathematics of Life

*Denied the Physical Scientist's Methods of Simplification,
the Biologist Makes Increasing Use of Statistics in
Analyzing the Results of His Research*

BY FREDERIC W. NORDSIEK

NOT long ago biology was a purely qualitative science, preoccupied with such activities as nomenclature, classification, morphology, and anatomy. Consequently, as late as the 1930's, students of biology received comparatively little training in mathematical analysis. But today the situation has changed and, at M.I.T., they receive as much mathematics as any other course of study at the Institute. Significantly, at M.I.T., the name of the biology course has been changed to Quantitative Biology. These observations reflect the extent to which mathematics (especially statistics, called the mathematics of experimentation) has now become an essential tool of the biologist.

Statistical procedures must be used to interpret quantitative biological experiments chiefly because of the present relatively primitive state of biological knowledge, and the need to draw significant conclusions from experiments on few samples. The physical sciences are easier to deal with and hence are more advanced; there a known combination of causes usually leads to a fixed and predictable result. Thus the physicist may readily set up a coil having a radius of two centimeters ($r = 2$) and four turns ($N = 4$). He can pass through this coil a current of precisely five amperes ($I = 5$); and he knows that if he does so a magnetic field, H , of 6.28 oerstedf will result in the core of the solenoid, since $H = 2\pi NI/10r$. Similarly, the chemist can weigh out 40.01 grams of sodium hydroxide and 36.47 grams of hydrochloric acid, both of established purity; and he can foretell with assurance that if such quantities of these two compounds are mixed, they will neutralize each other and will produce 58.45 grams of sodium chloride and 18.02 grams of water ($\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$).

In sharp contrast, the biologist rarely can equalize or otherwise precisely control his experimental elements at the beginning of a study. Suppose he wishes to learn the effect of a certain food upon the growth rate of albino rats or on the English setters shown in the illustrations. Can he hope to start with two or more animals of exactly the same weight? Very rarely is he able to do so, because even among animals born of the same parents and in the same litter, marked differences in weight usually exist at birth, and these differences widen as the animals mature. This disparity is true despite use of highly standardized strains of animals that have been bred for decades specifically for laboratory use.

Granted, then, that the biologist seldom can establish his initial experimental framework with precision, to what extent can he control his variables in the course of a study? Referring again to a simple feeding experiment, can precisely fixed amounts of ration always be fed? Again the answer is no, because if animals are allowed to

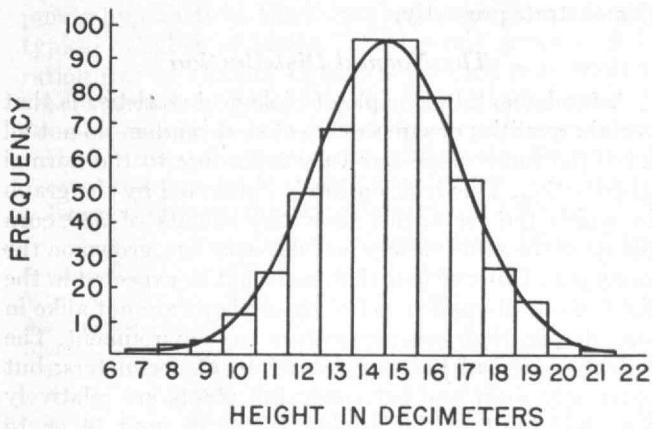
eat freely, they are apt to consume differing quantities. Precisely weighed amounts of food can be given by forced feeding, but this procedure is abnormal and may distort results because of injury or distress to the animals.

Extending the illustration afforded by an elementary feeding study, let us finally consider the happy but rare situation where two litter-mate animals are found that have the same initial weight and consume the same amount of food at the same rate. Even under such conditions of virtually unattainable perfection, the animals probably would not weigh the same at the conclusion of the experiment. In short, presumably equalized conditions in biological research are apt to lead to unequal results.

Obstacles to Quantitation in Biology

The relatively uncomplicated experiment just cited demonstrates three obstacles faced by the biologist in quantitative research. Seldom can he equalize the experimental and control elements at the outset of a study. Rarely can he adjust his experimental variables with precision. Finally, even if by sheer good fortune these two factors are held constant, the outcome still probably will be variable.

Whence these obstacles to quantitation in biology? They stem from the fact that significant biological research must be done with whole living organisms, because *in vitro* experiments at best yield limited information. Therefore, unlike the physicist or chemist, the biologist



The rectangles represent the relative frequency with which corn plants grow to the heights indicated on the abscissa, according to a study of 530 plants of the same variety and age and grown on the same plot of land (Emerson, R. A., and East, E. M., Nebraska Export Station Research Bulletin 2, 1913). The smooth curve is the normal distribution curve which might be expected to result when a very large (theoretically, infinite) number of plants are examined. The normal distribution curve plays an important role in biological studies; in a sense it is the basis of "the mathematics of life."



Unlike the physicist or chemist, the biologist cannot segregate his problem into elementary independent and isolated components for subsequent integration into a complex system based on the principle of linear superposition. Instead, he must deal immediately with a complex system, which is the living plant or animal. If he wishes to study the effect of certain food on the growth of animals, he will be fortunate if he can find a group of animals of the same weight and size and belonging to the same litter.

Photo by Harold M. Lambert

cannot segregate his problems into elementary components like electromagnets or acid-base reactions, for subsequent integration into complex systems. Instead he must deal immediately with a complex system, which is the living plant or animal. But today only the most superficial aspects of the functionings of living things are understood. As a result the biologist encounters in every organism many variables which he does not know, and hence cannot control. Such unknowns may outweigh the factors that he understands and is able to vary experimentally at will.

Yet a point has long since been reached where biological sciences essential to human welfare can advance only to the extent that their findings are expressed quantitatively. Thus the pharmacologist must establish dosages, the nutritionist needs to measure nutrient requirements in units as exact as milligrams, the immunologist must standardize serums and antitoxins derived from living animals. Fortunately statistics, an application of mathematics, "queen of the sciences," makes possible such quantitation on the basis of concepts we shall describe, and by means of procedures typified by one we shall demonstrate presently.

The Normal Distribution

A fundamental principle of biological statistics is that certain qualities of samples selected at random do not all have the same value but vary according to the normal distribution. This relationship is illustrated by the graph in which the rectangles show the heights of 530 corn plants of the same variety and the same age, grown on the same plot. Observe first that, as would be expected in the light of our discussion so far, these plants are not alike in size, despite their common nature and environment. The heights range all the way from 7 to 21 decimeters; but extremely short and extremely tall plants are relatively few, and most of the heights fall at or near 14 or 15 decimeters. The curve that has been sketched in on the graph is called the curve of normal distribution; it is the curve which would result if an infinite number of objects — corn plants in this case — were examined.

The normal distribution is ubiquitous in nature as it is in other situations in which variations result from unassignable causes. It may be observed in weights of animals, numbers of ridges on the shells of crustaceans,

numbers of colonies on agar plate cultures of bacteria, even in the volumes of loaves of bread, for bread loaves are truly biological phenomena, since they are leavened by a living organism, yeast.

Then, too, the normal distribution appears in broad terms in everyday experience and observation. Thus people of middle stature are often seen, whereas extremely short or extremely tall people are relatively rare. A single normal distribution is not, however, reflected here, because the heterogeneous population we see from day to day includes various racial stocks, each having its own characteristic height distribution. Moreover, the height distribution of women is essentially the same as that of men, although the mean height of women is, of course, smaller than that for men.

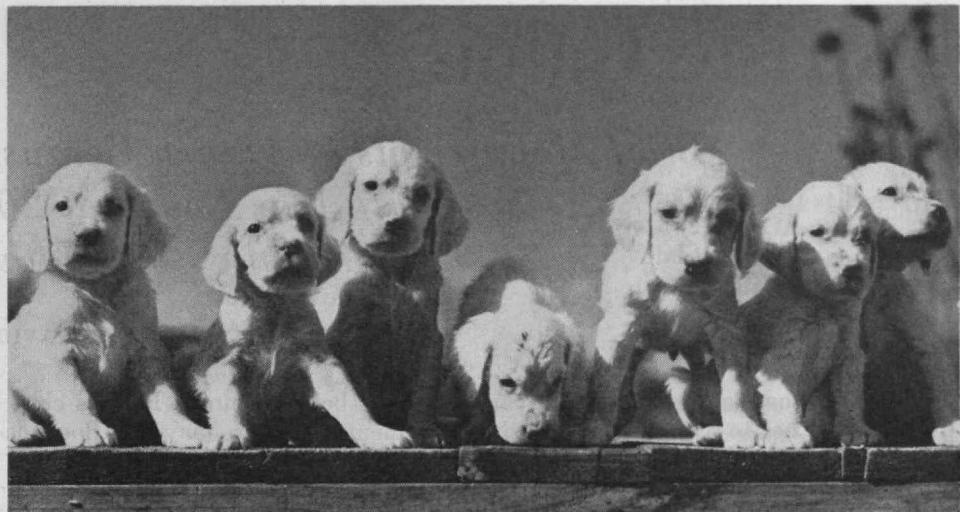
Chance in Statistics

Why do quantitative characteristics of living things usually follow the normal distribution? Although the full answer to this question cannot be given here, a most illuminating insight may be gained by consideration of the fact that similar distributions also appear in certain nonbiological phenomena, such as results of the tossing of coins. If a handful of coins is tossed together repeatedly a sufficiently large number of times, the outcome according to division between heads and tails will show much the same picture as do heights of corn plants (page 313). Tosses showing all heads or all tails will be as rare as the 7 or 21 decimeter heights. Roughly equal numbers of heads and tails will be as common as the 14 and 15 decimeter heights, and intermediate assortments of heads and tails will slope off symmetrically like the intermediate corn heights.

Coin tossing is usually thought of as governed by chance. Nevertheless all of the influences that determine the outcome of tosses are actually ponderables, such as position of coins in the hand, cleanliness and degree of wear of coins, force applied in tossing, angle of incidence of this force, height from the floor at which the toss is made, levelness of the floor, and resiliency of the floor covering. Therefore, "chance" in this sense is actually the combined effect of numerous variables that are neither regulated nor measured. Does not this last phrase have a familiar ring? Earlier in this article it was said, "the biologist encounters in every organism many

Should the biologist be fortunate enough to be able to carry on experiments (such as those to determine the effect of certain foods) with animals essentially identical at birth, wide differences in the weights of animals may be expected as the animals mature. Thus, the biologist is rarely able to equalize or otherwise precisely control his experimental elements during study, and hence he must resort to indirect means of evaluating his observations. In the evaluation of his studies, statistics play a major role.

Photo by Harold M. Lambert



variables which he does not know, and hence cannot control." The parallelism here is obvious. In fact the word "chance" is retained in statistical terminology to designate this relationship.

Overlapping Normal Curves

Let us then accept as axiomatic that, in general, biological phenomena when suitably segregated (such as separation of sexes in the height distribution of human beings) follow the normal distribution. To understand how this concept helps in interpreting quantitative studies of living things, suppose that the corn plants whose heights are shown in the graph are controls in an experiment, and that an identical group has been grown under the same conditions except for addition to the soil of a fertilizer that has the effect of increasing height. The observed heights of the fertilized plants could then be arranged in an array like the graph. These results would also follow a curve of normal distribution, but one lying further to the right, in the region of greater heights. If both control and experimental groups thus include as many as 500 individuals, significance of results is easy to measure. For example, if the two distributions had identical conformations, and the peak and extremes for the fertilized corn lay two decimeters higher than those for the control plants, the conclusion would be plain not only that the fertilizer had the effect of increasing heights, but also that it did so to the extent of some two decimeters.

Note, however, that since the control plants range from 7 to 21 decimeters in height, and the fertilized plants from 9 to 23 decimeters, most of both groups lie in the common range, 9 to 21 decimeters. Furthermore, quite a few of the fertilized plants are actually shorter than quite a few of the control plants. What then of experiments where many less than 500 individuals are observed, as usually must be true in biological studies? With experimental groups too small to fulfill a smooth normal curve, the few observations made are drawn at random from the true normal distribution. Therefore a study of corn heights attempted with only a few plants might conceivably show all of the fertilized plants shorter than all of the unfertilized plants.

In experiments where only limited numbers of animals or plants may be studied, statistical interpretation is indispensable. Procedures for this purpose are based on

mathematical handling of the relationship expressed graphically by the curve of normal distribution as shown in the graph. Derivations cannot be given in a discussion of this scope, but may be found in books on the subject, a few of which are listed at the end of this article.

A Small Sample Experiment

Typical of research where only small numbers of individuals usually may be observed are studies of animals. To illustrate this type of experiment a hypothetical study of lambs has been outlined, where two experimental variables are tested against a control. Such research performed on the scale of the survey of corn height (page 313) would require three groups of at least 500 animals each, or a total of more than 1500 animals. An experiment of this magnitude would be prohibitive in cost because of the economic value of the animals, the expense of feeding, the necessary housing, and the time required for observations. As a matter of fact, studies of this type based on 15 animals have been considered ambitious and definitive.

The table shows the data of such an experiment. Although the data and the conclusions they lead to are purely hypothetical, the values have been chosen to show typical weights of lambs. The control group is fed a ration free of vitamin D, and is shielded from sunlight. One experimental group receives (Continued on page 328)

HYPOTHETICAL EXPERIMENT TO DETERMINE EFFECTS OF SUNSHINE AND OF VITAMIN D ON WEIGHT GAINED BY LAMBS BETWEEN SIX AND TWELVE MONTHS OF AGE

Sunshine? Vitamin D?	Control Group		Sunshine Group		Vitamin D Group	
	No No	Yes No	6	12	6	12
Age, months	6	12	6	12	6	12
Animal			Weight of animal (kg.)			
1	27.7	37.1	26.3	41.0	29.6	42.1
2	26.0	39.2	26.6	36.3	27.7	42.5
3	26.7	38.7	28.1	39.1	26.1	40.6
4	29.5	38.0	26.8	42.3	26.8	41.8
5	28.6	39.5	29.6	41.0	28.6	43.0
Mean Weight	27.7	38.5	27.5	39.9	27.8	42.0
Mean Gain	—	10.8	—	12.4	—	14.2
Average "sunshine" gain	—	12.4 kg.	Average "vitamin D" gain	—	14.2 kg.	—
Average control gain	10.8	—	Average control gain	10.8	—	—
Difference	—	1.6 kg.	Difference	—	3.4 kg.	—
p value of difference	0.24	—	p value of difference	0.006	—	—

Évariste Galois

*Brief Manuscripts of French Genius,
whose Life Was Ended at 20 Years of Age,
Contain Vast Mathematical Riches*

BY DAVID AND CHARLOTTE B. LANDAU

MORE than a century ago Évariste Galois bequeathed to the world an enduring monument — the refined gold of a man's mind. The labors of his entire life are so concentrated that they are contained in 60 pages but these few pages are among the most extraordinary ever written by any mathematician. Was there any other genius who left so little which contains so much?

Those who understand Galois remain aghast at the vastness and depth of the foundations built by his remarkable mind. Here was a Titan's brain crowning a boy's body, for Évariste Galois died before attaining his twenty-first birthday. What a loss to France and to mathematical science! What a tragedy human jealousy, ignorance, and stupidity made of a life which could easily have become one of the most productive in the forefront of Nineteenth-Century mathematics. Genius always pays a toll for its existence and there was no exception to this rule even in enlightened, humane, and scholarly France.

The name of Évariste Galois is not too well known today even in his native France. Certainly Galois is not as well known as Descartes, Pascal, Fermat, Euler, or Lagrange — to whose company he had the undeniable right to belong. Napoleon made Lagrange a senator, a count, and a grand officer of the Legion of Honor. The King of Sardinia and Frederick the Great showered honors upon this same savant. How different was the short life of Galois! Because of his youth, his political opinions (which we should today call leftist), and an abundance of misfortunes and misunderstandings, the tragic life of Galois was "unhonored, unwept, and unsung."

The upheavals going on in Europe during the hectic period following the Napoleonic Wars left few spots that were able to retain their earlier tranquility. One of these was the little town of Bourg-la-Reine, situated a mere rainbow stretch from Paris. Although its name had been changed during the Revolution to Bourg Égalité, the town remained a peaceful and calm oasis of the times. It was here that Évariste Galois was born 137 years ago, on October 26, 1811. The house of his birthplace had been built before the French Revolution and was owned by Évariste's grandfather who used it as a private school for boys. At the beginning of the Empire, the elder Galois left his school to his son, Nicolas Gabriel, the father of our subject. The school prospered, not alone because of the disappearance of other scholastic institutions which were in the hands of the clergy but also because of the liberal views held by the Galois family.

In 1811, Nicolas Galois was a friendly and able man of 36. He was a writer of light poetry, an amateur actor, and was deeply entrenched in philosophy. With joy he witnessed the fall of royalty and even the decline of the

Empire. He was chief of the town's political party, and also mayor of Bourg-la-Reine.

Opposite the Galois family lived the reasonably well-to-do Demante family who preserved the traditions of intellectual culture. Thomas Demante was a doctor of laws at the University of Paris, and his daughter, Adélaïde Marie Demante, married Nicolas Galois and became the mother of Évariste. She was the boy's teacher until he reached the age of 12 — and an able teacher she was. In 1821 a semischolarship was awarded Évariste Galois at the College of Reims, but this was ignored because his mother wished him to remain near her. Évariste entered the Lycée Louis-le-Grand in Paris, in 1823.

What a change it was for the boy to enter that institution, its barred and grilled windows giving it more the appearance of a prison than a school. This contrast was particularly noticeable since he came from a home where everyone smiled even when serious. In the school, on the other hand, everything was in revolt, including the instructors. So reactionary were the school's teachers that they had to be held in check by a director who ruled with an iron hand. The school was a place of horror for young Évariste whose first year at the Lycée began to have its effects on his freedom of spirit. Mathematics did not then have an independent existence as was true at a later date; only a small part of the time was spent on this subject. The pupils were recruited from those in the higher classes of letters, and, strange to say, according to their political views of the future. Galois was able to enter the first year in preparatory mathematics.

By good fortune a copy of Legendre's *Éléments de Géométrie* came into his possession. This book fanned the fire of his mathematical enthusiasm by its crystal-clear lucidity. He was fascinated by its irrefutable logic and read it with understanding, in spite of progressing with the speed of one who reads a story of adventure. In fact, it is stated that he mastered the work in a short while, whereas almost two years would be required for the average student to really absorb its contents thoroughly. His intelligence enabled him to dispense with all effort; like a bird he left the earth to rise to the highest peaks with a mere flap of his intellectual wings.

He next attempted to study algebra, but was unable to find as gifted an expositor as he did in geometry. At first he was discouraged with the subject, but it was not long before he found stimulation in the work of Lagrange who was perhaps the greatest mathematical master of the age. It was in the classic works of this great mathematician that he grounded his algebraic studies. He drank at the source itself, studying Lagrange's *Résolution des Equations Numériques*, *Théorie des Fonctions Analytiques*, and *Leçons sur le Calcul des Fonctions*. What good fortune

that he did discover this teacher, and a little later, another brilliant star in the mathematical firmament — Abel. Galois now began to read with insatiable avidity mathematical works which taxed even the most able mathematician, although he was but a mere lad of 14!

Paradoxical as it may seem, his class work in school mathematics was only mediocre. Undoubtedly this was because his genius could not concern itself with mere plodding through the elementary steps of the traditional school mathematics. Since he solved the most intricate mathematical solutions entirely in his head, how could it have been otherwise? As one might expect, he was far ahead of his teachers. Orthodox details upset him and at times he lost his temper; under the circumstances who would not? Notwithstanding, he carried off prizes in the general examinations.

In his mathematical work, he was so far advanced that his teachers, including his mother, said that there was something strange about him. Of course a genius is always strange because he has abilities which surpass the standard rules of measurement. There was no yardstick with which to measure the Galois mind. He lighted his own path with a divine light — the halo of genius.

Since mathematics completely dominated this youngster, naturally he found it useless to spend time on rhetoric. He did not want words for he needed only the symbols of mathematical logic. Shall he be blamed for this? Is not mathematics the key, the *passe-partout*, which opened the doors of man's deepest discoveries in all the sciences?

At 16 Galois was already on the road of great mathematical discoveries. He now took the examination to enter the École Polytechnique which then, as today, was the foremost school of French mathematicians. He failed to pass the examination, not because of his own inability, but because of stupid, or perhaps intentional injustice. In commenting on this failure a quarter of a century later, Terquem had this to say about the verdict of the examining board: "A candidate of superior intelligence is lost with an examiner of inferior intelligence." We may imagine how his failure embittered Galois. What boy of 16 would not have been wounded by such a failure to enter the school which he adored so much? Even genius is human.



Courtesy of Scripta Mathematica

The disappointments of a turbulent life did not prevent him from making outstanding contributions to mathematics.

different from that of Bravais who took the first. Richard referred to Galois as "the Abel of France." Do we need more than those four words for an eulogy?

In 1829 Galois published his first memoir entitled "*Démonstration d'un Théorème sur les Fractions Continues Périodiques*" in the *Annales de Gergonne*. It is strange that this paper on continued fractions contained no hint on the other important work he had done. During this year he also made his first communication to the Académie des Sciences. He was but 17 years of age when he made, as Auguste Chevalier said, "*des découvertes de la plus haute importance sur la théorie des équations*" . . . and yet he failed to be passed in his entrance examination to the École Polytechnique. The reason is a mystery. Galois now became deeply engaged in expanding these theories — the sequences of which are not exhausted after more than a century! We who have profited from his work certainly owe Galois a debt of gratitude. And yet how little has been done, even in France, to memorialize the name of this young mathematical genius. How many will recall his memory on his next birthday?*

* To commemorate the 100th anniversary of the death of Galois and to keep alive the name, a Galois Institute of Mathematics was founded in 1932. This *beau geste* (and the volume *Galois and the Theory of Groups*) we owe to Professor Lillian R. Lieber, Head of the Department of Mathematics and Director of the Galois Institute of Mathematics of Long Island University, and her husband, Professor Hugh Gray Lieber, Head of the Department of Fine Arts at Long Island University.

A year later, at the age of 17, Galois found himself in the company of an able and sympathetic teacher, Louis Paul Emile Richard, who taught advanced mathematics at the Lycée Louis-le-Grand. Richard inspired many great mathematicians, included among whom were the astronomer, Leverrier, the able mathematician, Serret, whose advanced algebra gave the first exposition of Galois' theory of equations, Galois himself, and later the master analyst, Hermite.

Richard surely knew mathematicians. What Richard thought of Galois may be gained from his recommendation that Galois be considered entirely apart from the other students in the École Polytechnique. "Galois was far ahead of any of the pupils. . . . He only works in the highest portions of mathematics," said Richard who would give him the first prize. At the general competition Galois was awarded the fourth prize for a composition which was no

Galois did not publish his fundamental discoveries as he wished to present them as a memoir to the Académie. Therefore, as was the custom, he gave the memoir to Cauchy who was, at this time, the leading French mathematician. Cauchy promised to present the memoir to the Académie but he never did. He said he forgot! The failure would have been of small importance had not Cauchy lost the author's manuscript! Had he been asked to do so, Galois would have sent another memoir to replace the one lost by Cauchy. Galois never heard any more from the master mathematician for as Chevalier tells us, the Académie was not interested. This was the beginning of a series of disasters which soured Galois into a contempt of the Académie and academicians. Added to the bitter disappointment which he suffered in the loss of this memoir, Galois received a shock in the death of his father by suicide.

Notwithstanding his genius, the youthful Galois was unable to harvest the field of his fruitful discoveries, being frequently dulled by petty tasks which made him revolt against the teachings and punishments meted out to him. He had a persistent obstinacy, so that nothing daunted him from rising against all odds to the peak of the pyramid of mathematical thought. As a matter of fact, he was already at the top but his teachers did not know it. How could they, these men who knew less than their pupil? In fact, his teachers were often jealous of his gifts. But this was not altogether surprising for the merits of a genius are not understood except by those who are by nature gifted to be almost such themselves. The saying "Genius speaks only to genius" was never more true.

Obsessed by the insatiable love for his subject, Galois presented himself for a second time at the entrance examination of the École Polytechnique; he was now 18. Once more misfortune shook his hand, and he failed. During the oral part of the examination, when his examiner was both wrong and obstinate, Galois became so enraged that, in a sudden loss of temper, he threw a sponge at his tormentor's face. The doors of the Polytechnique were now closed forever to him. Was this new failure due to lack of knowledge of the subject? Hardly. Was it the result of jealousy, ignorance, or stupidity on the part of examiners who were not worthy to sit in judgment? Probably each of these made their contribution, while added to this was the tragic death of Galois' father caused by the intrigues of the clergy. What a cross of ill luck he already carried on his youthful back.

Having decided to become a teacher, Galois entered the École Normale where he remained for two semesters at the end of which he was asked to leave. The new school director leaned in the direction of the royalists and the clergy, and these leanings were not calculated to help our revolutionary mathematician. Because of these inclinations of the school head there were delays and temporizings which had their tragic influences on the spirit of Galois.

Ill luck followed Galois in all his undertakings, even in his one and only love affair. His mathematics alone kept the fire of his reason burning. To this amour, which never abandoned him, he returned when all the rest was dark and dismal.

He now reached the age of 19 and was admitted to university standing. Three papers containing some of his great work with new ground on The Theory of Algebraic Equations were now prepared. He presented these papers

to the Academy of Sciences in competition for the great prize in mathematics. These theses were worthy of the prize since they were, beyond doubt, the efforts of an extraordinary mind of extreme originality. With perfect justice Galois said of this work: "I have carried out researches which will halt many savants in theirs." He was right, as his own countryman, Camille Jordan, showed when he "discovered" Galois 38 years after his death and wrote a substantial volume as commentary on "what Galois, at nineteen, had set down on a few sheets of foolscap!"† But now another calamity befell him.

The secretary of the Academy, the famous mathematician, Fourier, received the manuscript and took it home for examination. Before Fourier had time to study its contents death overtook him! A search failed to disclose even a trace of the Galois papers which would probably have yielded a priceless addition to our mathematical treasures. After Cauchy's lapses, what a blow this was to that boy of 19 summers! So hurt was he by this new misfortune that Galois is credited with having said: "Genius is condemned by a malicious social organization to an eternal denial of justice in favor of fawning mediocrity." Who, in his place, would not have felt as much? Successive misfortunes caused his hatreds to grow and, as a consequence, he threw himself into the political circus on the side of the forbidden *Républicains*, who were what we would now call Liberals. Championing the rights of the masses, the revolution of 1830 caused him many troubles, in spite of having at first filled him with joy. For his outspoken opinions he was expelled from the school. Then, as now, politics was a dangerous business in which to mix and Galois dared it *quand même*. France's sonorous notes of freedom — Liberté, Égalité, Fraternité — had not yet been carved into the stones of its public buildings and monuments. Let us divert here for a moment from our main topic and take a look at the conditions under which Galois lived.

Galois had the misfortune to live in one of the most troubled periods of his country's existence. He saw the end of the Napoleonic regime and the invasion of his native land by allies who brought the Bourbons back to France. Under the allies protection, Louis XVIII became King of France and he lost no time in taking away from the people the benefits gained from the Revolution and the Empire. The south of France lived under continual uprisings and the Chambre voted the suspension of individual liberties and instituted violent controls. These became so violent that on the advice of his Minister Decazes, who was a rather liberal-minded person, the King himself dissolved the Chambre, whose members were said to be more royalist than the King himself! This did not prevent new and more reactionary measures to be taken after Decazes was no more in office in 1820. These violent measures caused many conspiracies to rise.

In 1824, Charles X succeeded his brother but he had learned nothing from the events which he had witnessed. His decrees against the liberties of the press and the people caused an uprising against him. He escaped the horrors of the 1830 revolution, however.

Louis Philippe, who, strange as it may seem, was once a professor of mathematics at the College of Reichenau in Germany, returned to France after the fall of the Empire. (*Continued on page 334*)

† *Scripta Mathematica*, VI: 2, June, 1939, page 100.

Ah, Sweet Mystery of Sleep

Differences in Temperament and Metabolism Account for the Wide Variations in Individual Needs for Sleep

BY M. F. ASHLEY MONTAGU and EDWARD MILTON

THE lecturer looked up from the title page of his notes and out into the politely expectant faces of his audience. "Is anyone here familiar with the socio-economic patterns of the Watusi?" There was no reply other than a change of expression from that of simulated intelligence to one of collective opacity. "Fine," he thought, "now I can really let myself go."

The lecturer's relief upon realization that he was addressing an uncritical audience is most understandable — particularly by those who have ever been tempted to make any public utterance on the nature of sleep. Many have been tempted, for sleep is a common phenomenon in which we all participate to a greater or lesser degree. From a purely subjective point of view, then, we might easily presume that one man's opinion in the matter is worthy of as much consideration as the next. This attitude may account in part for the large body of pertinent and sometimes pungent literature that has accumulated since the time of Aristotle. But in view of the numerous controlled investigations into the nature and cause of sleep that have been conducted by men of scientific training within the last century, it is a foolish amateur indeed who doesn't tread much more gingerly in those same fields where once he was accustomed to prance without restraint. This does not mean that there is no place left for intuition or imagination. There will continue to be room for such expression until all of the physiological and psychological processes involved in sleep are clearly and finally understood.

How far we are from a clear understanding of those processes can be better appreciated when we consider a few of the theories of the cause of sleep that still enjoy some popularity.

Certain investigators believe that sleep is caused by a change in the distribution of blood to the brain. Among this group there is a distinct division of opinion: some hold that an excess of blood

in the brain is the determining factor — others state with equal conviction that sleep is induced by a deficiency in the blood supply to the brain. Recent investigators have reported that they were unable to detect any difference in the blood flow to the head in sleep and in wakefulness.

Another theory suggests that sleep is caused by the presence of toxins or waste products in the blood stream which exert a depressing effect upon nervous tissue. Still another theory depends upon the belief that a gap between nerve cell endings along a nerve fiber develops to an extent sufficient to break contact between the neighboring nerve cells. The resulting cessation in the conduction of those normal impulses that ordinarily flow along the nerves from the various sense organs to the brain during the conscious state leads, so the theory goes, to that periodic condition of rest known as sleep.

It should be realized that there are almost as many theories of sleep as there are investigators within the field. The three random theories that have been so briefly described above serve only to indicate the diversity of certain current points of view about sleep.

No less interesting is the attitude that certain writers have taken about sleep. Some regard it not as a blessing but rather as a regrettable interruption of the waking state. Frank S. Hoffman in *Psychology and Common Life** made the generalization that great minds spend less time in sleep than do persons of inferior powers. For those of you who, like Shakespeare (or was it Edward Young?), think of sleep as "nature's sweet restorer" the words of Hoffman may strike a somewhat discouraging note. He says: "The more perfect the development of the brain, the more complete its adaptation to its environment, the less friction and waste attending its exercise and consequently the less sleep. Civilization is the progress from sleep to wakefulness.

* New York: G. P. Putnam's Sons, 1903. \$1.50.

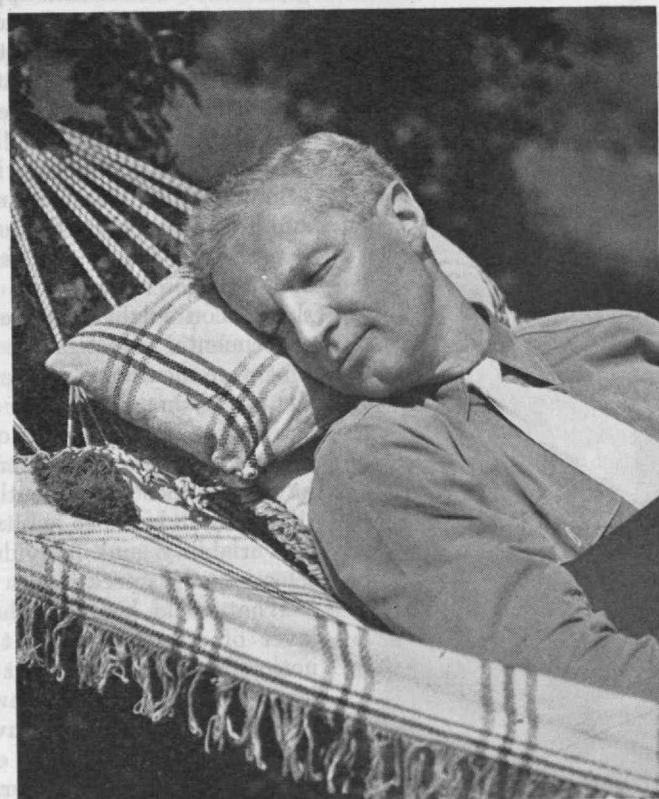


Photo by H. Armstrong Roberts

There are almost as many theories of sleep as there are investigators of the subject, but the generally held notion that a person requires eight hours of sleep daily is something less than an immutable law of nature.

The highest culture of which any human being is capable will be reached when the sleep and dream period is reduced to the minimum and the nobler activities of the soul are brought to the maximum of their efficiency and power."

The majority of us who are not constituted of pure brain and little else, but who are handicapped by the normal complement of arms, legs, and a torso, along with the usual number and kind of organs therein contained, will find a more sympathetic champion in Dr. Arnold Gesell who speaks of sleep as "a readjustment of the whole machinery of the organism . . . to protect the total and remote welfare of that organism."

This latter concept is given further amplification by another group of research scientists who consider sleep and wakefulness as two phases of the cycle of existence in which each phase complements the other, and in which those alternating phases, in the normal human adult, take on the pattern of a relatively regular sleep-wakefulness rhythm.

Even the most casual of observers cannot have failed to notice the disproportionate amount of time that the newborn spend in sleep. It is an almost continual oblivion that appears to be interrupted only when the baby is hungry, too warm, too cold, or is otherwise disturbed. As the child grows older, its sleeping habits become more highly organized. Instead of a continual series of four- to five-hour naps, there is a consolidation of these sleep periods into one long sleep phase during the night, followed by as many naps during the day as the age and general health of the child may indicate. As the child continues to grow, the naps are given up one by one, usually to the regret of an increasingly harassed mother, but almost always to the delight of the child whose curiosity and avidity for the experiences that await him

during the day can hardly be contained. Whereas no adult in his right mind could be expected to leap out of bed at five o'clock in the morning, strap on a pair of roller skates, and whiz down two flights of uncarpeted stairs, banking smartly around the dining room walls and into the kitchen in hot pursuit of whatever breakfast food it is that makes champions, such forthright demonstrations of the desire to be up-and-doing are common enough among the younger set. These cheerfully explosive greetings to the new day are in marked contrast to the behavior of the newborn. Not only is the infant completely lacking in such expressions of enthusiasm but he even exhibits a positive and often obstreperous reluctance to waste any time at all in the waking state. He squawks and squalls. His tiny face screws up into a contortion of protest. Peace and full contentment come to him only when he relapses into that vegetative existence which we call sleep.

The sleep requirements of the adult are something else again. Before we attempt to describe them, it should be understood that all further discussion is based upon certain broad assumptions. We assume that the majority of the readers of this article are members of the same general type of civilization whose sleeping period is taken in one piece rather than in bits and driblets at any time that strikes the fancy. For individuals of such a society, a solicitous "Did you sleep well?" is a question second in frequency only to "How do you do?" or "How are you?" In one sense it is almost synonymous with the other two, since the implication is that if you've slept well you are, as a result, feeling well. So clearly understood is the importance of refreshing sleep to the general physical and mental well-being that a great deal of attention has been given those factors that appear to affect both the quality and duration of sleep. Some of those factors are beds and bedding, ventilation and temperature of the bedroom, eating-drinking habits just prior to bedtime, and the establishment of regular sleeping habits.

With the abundance of "How To . . ." literature that has made its appearance in recent years — everything from "How To Play Golf in the Low Seventies" down to and including "How To Build A Summer Cottage out of Beer Bottle Tops" — it is rather a pity that a similar sure-fire prescription can't be written for a good night's sleep. You might imagine that a carefully controlled experimental investigation of the factors affecting sleep that were mentioned above would go a long way toward the establishment of such a formula. Not at all! Practically the only unqualified conclusion that has been drawn from these experiments, and a great many of them have been most intelligently conceived and executed, is that man, in his sleep habits, shows the same high degree of variability and individuality that he does in the selection of his neckties.

What could be more shocking to the literal-minded lover of pat generalities than the discovery that the notion "man requires eight hours of sleep" is something less than an immutable law of nature. It is, of course, nothing more than a conveniently expressed average. Some people do famously on five or six hours of sleep; others are not fully recuperated on less than seven. Still others find their optimum to be eight and nine, or even 10 hours of sleep. These differences are accounted for, among other things, by individual differences in temperament and metabolism. Even within the adult span of

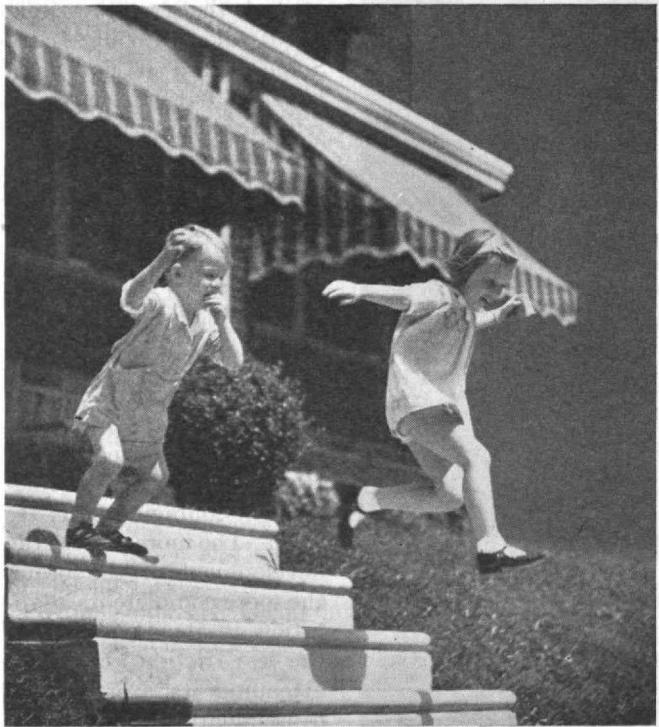


Photo by Harold M. Lambert

Whereas no adult in his right mind would be expected to leap out of bed at five o'clock in the morning . . . and whiz down two flights of uncarpeted stairs . . . such forthright demonstrations of the desire to be up-and-doing are common among the younger set.

the same individual there appear to be differences in the amount of sleep required. Older people, it has been noted, seem to need less sleep than they did during their middle years.

Similarly, any attempt to pontificate on the pros and cons of eating and drinking just prior to bedtime must result in statements so bristling with qualifications and exceptions that, for all practical purposes, they cancel themselves out. You probably know, or even may be, an individual for whom a sip of coffee and a bit of buttered toast adds up to a most harrowing pursuit by ghouls and goblins through the endless and vastly echoing corridors of the night. And then consider, if you will, those deeply, sweetly sleeping ones who, not 15 minutes before, washed down two onion-garnished, Liederkranz-smeared fried egg sandwiches with a schooner of beer. See how beatific their countenances — with what relaxed and languorous grace they lie. Not for them the hideous specter of a Headless Horseman nor even the ceaseless tossings of insomnia — but only undisturbed, health-giving sleep.

However exasperating and contradictory such typical examples may be, they do serve the excellent purpose of reminding us again that in any given situation involving man we must expect differing and even opposite reactions.

There is nothing intrinsically harmful in a light snack before bedtime. In fact, Walter B. Cannon, in his excellent book *Digestion and Health* † pointed out that such a snack acts as a check on hunger contractions of the stomach during the night and consequently eliminates disturbances from this source which so often interfere with sleep and produce restlessness. If any general rule for eating-drinking before bedtime is to be established, it might well be that of following the dictates of your own taste so long as they lead to the satisfaction of your sleep and general health requirements.

In the matter of beds, we apparently come closer to grips with reality. Here is something tangible, something that can be touched and tested. With the easy confidence that is so characteristic of dealings with the familiar, one scholar learnedly described the most suitable bed as that which exerts equal and opposite pressures to the pressures that the recumbent body exerts upon it. It is to be hoped that you will select a bed of this sort. Any other type is apt to fall within one of two questionable categories. One, "The Wishy-Washy," is a bed so miserably lacking in spirit that any attempt to use it for more than decorative purposes will result in a repeated series of crashings through to the floor until either the bed or the thwarted sleeper is unable or unwilling to continue. The other, even worse, has been appropriately named "The Challenger" by an anonymous Chicago social worker. This model comes equipped with a highly developed competitive instinct and a four-cycle, air-cooled, gasoline-driven ejector capable of delivering a vertical thrust at 375 horsepower. Its interesting possibilities, even to the mechanically naïve, should be obvious.

What you want, of course, is a bed that will permit you to sleep in a completely relaxed manner — one whose construction or shape sets up no muscular tension but which allows you to float in a dreamless state of utter unawareness. How hard or how soft such a bed should be is a matter of your own taste.

The word "taste" has been used a number of times to

indicate the method by which an individual may choose from among several conditions the one condition that most favors his particular sleep requirements. It should be clear that such a preference or manifestation of taste is not merely an affectation but actually represents a real need that has been recognized by the individual concerned. This recognition often comes only after a period of personal trial and error. For example: Mr. X has discovered that he requires nine hours of sleep to be at top efficiency for the demands that his daily work makes upon him. He rests most comfortably in a bed that is rather stiff and firm. Even during the winter he seldom uses more than one sheet and one blanket to cover himself. He claims that anything more oppresses him with its weight. He likes lots of fresh air. On the few occasions that he failed to open his bedroom windows, he awoke feeling heavy-lidded and depressed. Mr. X has a hearty appetite but he has long since given up his indulgence in bedtime snacks. For him, they invariably resulted in sleeplessness. Once asleep, Mr. X is not easily disturbed. Voices in the next room, the closing of a door, a sudden thunderstorm — none of these things awaken him. As Mr. X would put it, "I slept like a log." Mr. X didn't sleep like a log at all. He changed position a number of times during the night, he readjusted the covers, he muttered softly to himself, but he didn't wake up.

The various factors mentioned above are, in a sense, like the pieces of a mosaic that have been hand-picked and fitted together by Mr. X into a pattern that is just right for his particular and individual sleep requirements. His only criterion in making that selection was to ask, "How do these things affect the quality and duration of my sleep? Do they contribute to it or do they detract from it?" In answering those questions to his own positive satisfaction, Mr. X simultaneously established a personal formula for restful, health-giving sleep.

It should be increasingly clear that any attempt to achieve a regular routine of restful and sufficient sleep does not depend upon an understanding of the physiological changes that precede sleep or that transpire during sleep. Nor is it necessary to be conversant with the more acceptable theories of sleep. But it is of paramount importance that we recognize those individual requirements and conditions, the satisfaction of which normally assures a good night's rest. In this respect, you are your own best investigator and counselor, for upon your own daily observations of the conditions under which you sleep, and upon your own estimation of the wholesomeness of that resulting sleep, you can best determine what corrective modifications may be required. However obvious this statement may appear, it is one that deserves the greatest emphasis. Unfortunately, far too many individuals are prone to reject the obvious in favor of the well-intentioned but often ill-advised suggestions of their friends. The alarming increase in the indiscriminate use of barbital and other hypnotics to induce sleep is today's tragic example of how dangerous such irresponsible suggestions may be.

When, like Mr. X, you have discovered your own formula for wholesome sleep, and when you have established that formula as a regular habit of your daily existence, it is probable that you'll be content to let the laboratory investigators continue their efforts to unravel the mystery of sleep while you blissfully and unconsciously practice it.

What's on the Worker's Mind?

*Enjoying High Wages, Good Working Conditions, and Leisure
American Workers Look to More Stable Employment
with Security upon Retirement*

BY PAUL MEADOWS

DURING the first two years following World War I, Whiting Williams made a journey among American workers. Formerly personnel director of the Hydraulic Pressed Steel Company, he wanted to know, as a worker himself, the problems of industrial workers. He took one employment after another, in different parts of the country and in different industries. His two-year tour he described in a vigorous and informing book, published in 1921, *What's on the Worker's Mind?**

It is a good question, it is important, and a great deal of the economic and political future of the industrial West is involved in it. A prime difficulty about it, of course, is that there is no really reliable way of knowing whether or not one has an answer. If there is such a thing as the mind of the workers *en masse*, one can be certain that it will change, on some matters and to some extent at any rate. The method Williams used inspires confidence in the answers one receives no more than does a newspaperman's quick survey, written after a few weeks' visit to Russia and purporting to tell all. Improvements have been made on Williams' method since his day. To cite a few instances: there are the studies of the industrial psychologists, the elaborate investigations of the specialists at the Hawthorne plant of the Western Electric Company, the work of the Yale Institute of Human Relations, and last, but certainly not least, the recent reports of the industrial sociologists.

Social scientists are still unprepared to give unqualified support to a new device for discovering what's on the worker's mind — the public opinion poll — but they respect it, and they have high hopes for it. Critics of the polls have been justifiably concerned with certain problems of poll procedure and poll interpretation, mainly those involving bias. Their caution should serve as a precaution for anyone interested in the data collected by the polling agencies. At the same time critics would not do away with the polls, and all of them look forward to their extension. One leading expert has recently made a plea for world surveys by opinion testers, and the journal, *Public Opinion Quarterly*, regularly summarizes the findings of 13 different national polls, nine of them foreign. With adequate safeguards against prejudice, the opinion polls may be regarded as an absolute essential in a democratic industrial society. Their popularity can be explained in part in terms of their usefulness to special interest groups, and in part in terms of their rather obvious usefulness as guides to the general public.

During the last decade the national polls of labor opinion about labor problems have piled up a wealth of information about the mind of the worker in America. It is true these reports have focused on specific questions,

and the flow of national and international events has conditioned the opinions expressed at any time.† Moreover, rank and file sentiment in any sector of our society about any problem tends to get its cues from leadership; certainly it tends to be mobilized by leadership from time to time. An expressed opinion, therefore, bears no one-to-one relationship to a persisting mind-set, and it does tend to be changed. The public opinion polls will not tell us fully what's on the worker's mind. Probably such opinion sampling techniques are to be regarded only as superficial and perhaps not too dependable, but they help. It may be hoped they will acquaint us, to some extent, with that uneven and inadequately surveyed terrain called labor.

Whiting Williams was very deeply impressed, in his conversations with American workers almost a generation ago, by the fact of "the fundamental importance of the daily job," which he called "the axle" of the worker's world. Williams moved among the workers during a period of unemployment; their obsession with the job can be easily understood. However, the circumference of the worker's world in an age of mass communication and mass unionization has greatly expanded during the interwar years. Do the polls now suggest a different picture of labor thought about the job?

The Importance of the Daily Job

They report a certain basic satisfaction with it. The Roper poll (for *Fortune* magazine) found, in the spring of 1947, that three-quarters of American laborers agreed that their jobs are interesting nearly all or most of the time; a fifth regarded their work as moderately or completely dull. According to Roper, the American laborer was also inclined to feel, as expressed in four out of five interviews, that his job is really essential to the success of the company. This sentiment was, in fact, stronger in the big factories than in the small companies. Apparently, the job is still fundamental, as Williams observed.

† The literature on the polls is extensive. Most of it centers on two questions: whether poll data are representative and whether poll interpretations are fair. Polling agencies are, it is frequently contended, inclined to bias, conscious or unconscious, in the selection and phrasing of questions, in the interview methods employed, and in the generalizations from data. Two of the best reviews of opinion studies are: A. M. Lee, "Sociological Theory in Public Opinion and Attitude Studies," *American Sociological Review*, 12 (June, 1947), 312ff.; A. Kornhauser, "Are Public Opinion Polls Fair to Organized Labor?" *Public Opinion Quarterly*, Winter, 1946-1947, 484ff. The latter article, surveying 155 questions about unions, concluded that three-fourths of all American Institute of Public Opinion (Gallup) questions and about one-third of those from the other agencies "are in the negative direction." However, since Kornhauser illustrates rather than demonstrates the process by which he arrived at this sweeping generalization, his conclusion is not wholly tenable.

* New York: Charles Scribner's Sons, \$2.50.

However, the present-day workingman is apt to qualify such generalizations about his work. Asked by Roper if he thought his job too simple to bring out his best abilities, he said, in one case out of four, that it was. To the more revealing question, "Does your job really give you a chance to try out ideas of your own?" almost half (49 per cent) said "no," and the percentage of those saying "no" was considerably higher among those workers who thought their job dull most or all of the time. Nevertheless, the worker will probably not say now, as he did then to Williams, that he is worn-out at the end of the day. Two-thirds of the workers told Roper they were not, although more than half (57 per cent) of those who find their work monotonous complained of fatigue. Improved mechanical and administrative technology in the last quarter of the century has undoubtedly been responsible for this apparent change.

One notes again and again in the polls a certain sophistication about the job. For example, contrary to the American mythology on the subject, the quality and energy of the performance at work do not pay off in promotion or advancement, according to half of the workers questioned by Roper in the winter of 1946-1947. Four years earlier he had found that almost two-thirds (61.6 per cent) of factory workers thought that their chances for advancement were poor or only fair, and men under 34 were almost as skeptical (63.6 per cent) as men 50 and over (76.6 per cent). Moreover, the prospect of going up the ladder of management — for instance, becoming a foreman — seemed quite uninteresting to 58 per cent of the workers who said, in fact, that they would not like to be a foreman. Almost half of the one-third who indicated that they would like to become a foreman also said that they do not expect to be advanced to that position. Interestingly enough, slightly more than a fifth (21 per cent) of those under 40 years of age, as against 17 per cent of those over 40, thought that they would ever get beyond a foreman's position. Less than half of the college-trained factory workers thought that they would advance beyond that rank.

Williams came back from his observations in the field perturbed by a bad morale situation among American workers. The polls, particularly that of Roper's, also encounter a morale problem, although they have marked it off analytically in a manner somewhat different from that of Williams'. A man's morale is good, it seems, if he is interested in his job, is not overworked, feels secure for old age, has confidence in his ability to advance, and believes that merit is recognized and rewarded. Roper found in the late spring of 1947 that three out of five American workers can make good on three or more of these criteria of good morale; the other two he designated as below the average, and in another connection he spoke of them as miserably adjusted. Workers were asked: "If you should be able to go back to the age of 15 and start life over again, would you choose a different trade or occupation?" Somewhat more than half (57 per cent) said they would.

Poll data seem to show that job satisfaction is not entirely a matter of possessing all the factors presumably favorable to high morale. For only half of the factory workers who had all five of the high morale factors said that they would stay with the same kind of work if they could start all over again. The best bet for morale seems to be a worker who is satisfied with the firm for which he is employed and who is also satisfied with his kind of work. Yet it is most enlightening to learn that even though seven of ten (71 per cent) of the American factory

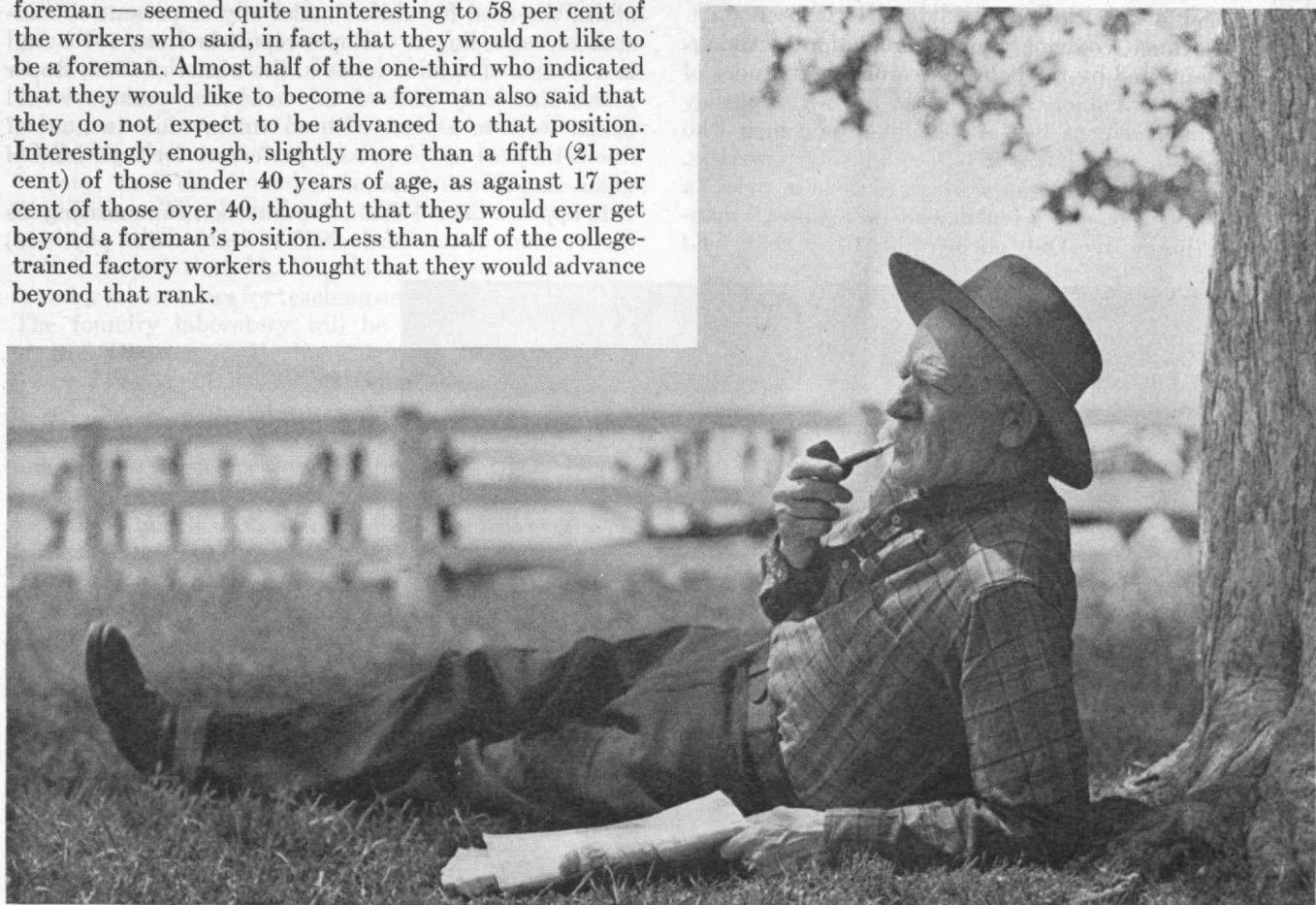


Photo by H. Armstrong Roberts

Security in old age is an objective of the American worker but there is almost equal division of opinion among the workers themselves that financial independence can be achieved at 65 years of age. A poll conducted in the spring of 1947 indicated that 42 per cent of the factory workers thought it likely that they would be able to retire in reasonable comfort at 65 years of age, but 41 per cent thought it unlikely that they would be able to do so.

workers are satisfied with their company, only one in eight (13 per cent) possesses all five of the favorable morale factors listed by Roper. The job is, it seems, still fundamental in the sense that it appeared to be to Williams at the close of the first World War.

Management and the Worker

In his trip throughout American industry, Whiting Williams noted a widespread ignorance on the part of the workers about the plans and purposes, the aims and ideals, and even the character of his employer, the company. He found great rifts between management and labor—hostility, suspicion, and fear.

Poll data seem to indicate a slight but by no means pronounced improvement in labor-management relations since that time. Asked in the late spring of 1947 if "your company is about as good a place to work as there is," seven out of ten workers said "yes." This attitude may be expressive simply of resignation, but there are probably other interpretations.

The polls show a high correlation between contentment with the type of work and company loyalty. Yet American laborers have misgivings about their employers. Less than six per cent of them think all employers are fair to their employees concerning hours, working conditions, wages and salaries, and collective bargaining. Only some, or about half, of the employers would win a vote of confidence in their fairness in these matters, although less than half of the workers polled would express such opinions on such a vote.

One grievance, commonly given circulation by unions and substantiated by the polls, concerns the attitudes of employers toward unions. Asked in the fall of 1946 if they felt that management has in its ranks some men who are trying to render labor unions completely powerless, half of the American union workers said there were "a few" such persons, and a fourth said that "most" managers had this motive. Only one in eight (13 per cent) held

that there were practically no managers trying to do this.

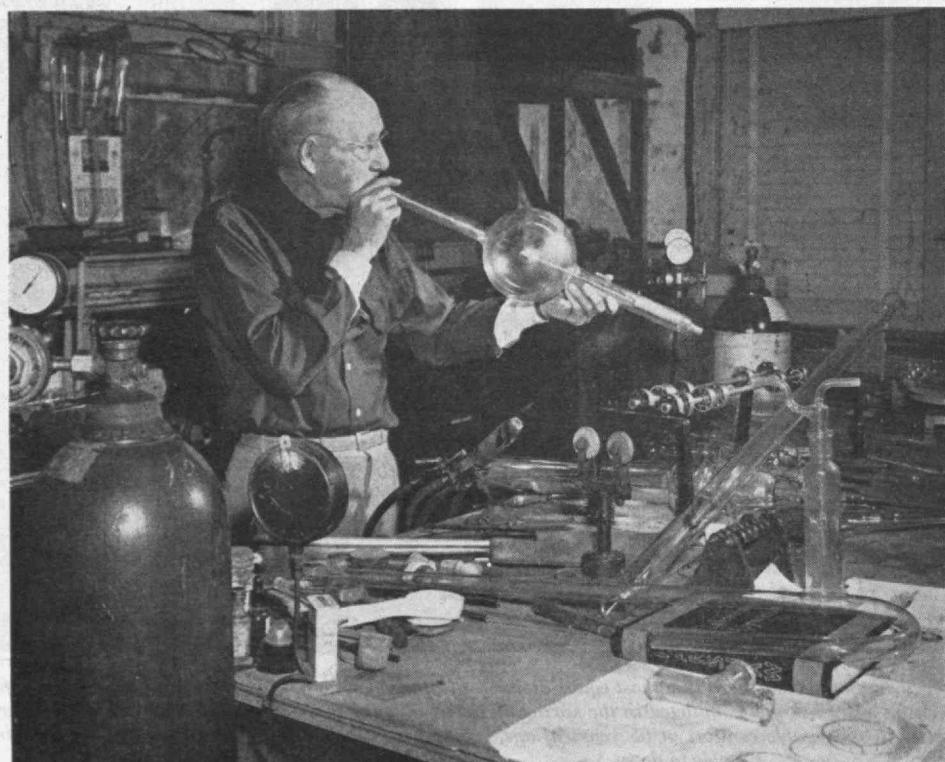
American workers want a voice at the management conference table in order that they may be represented. Three out of four factory workers, polled in February, 1943, welcomed this proposal as a good idea. As to what a worker's representative should say in such a situation, the only matter about which factory workers were relatively noncommittal was payment of dividends. On all other questions,—that is, working conditions, wages, production plans, promotion, salaries of management—50 to 97 per cent of the respondents were cordially in favor of having an opportunity to "say something."

Most laborers (56 per cent) are agreeable to the notion that the foreman should join a labor union, according to a Gallup survey in May, 1945. This same question had been asked two years earlier, in the summer of 1943, and it revealed that skilled workers were more responsive to this suggestion (58 per cent) than the semiskilled or unskilled (50 per cent).

Unionists as Economic Men

Unionization is one form which the attitude toward management takes. People who belong to unions are, of course, more sure of the importance of unionization in order that labor interests be protected than are those who do not belong. However, even nonunion workers are not unequivocally opposed to the union movement. As against 59.6 per cent of the unionists, half of the nonunion workers agreed with two check list statements which affirm the need for unions under any or present circumstances, according to a Roper report in June, 1940. And in a sample of opinion made in the winter of 1942, Roper found that only half of the nonunion workers would rather work in a place with no union, while two out of five (41.5 per cent) expressed preference for some kind of union shop, local or national.

It appears that Williams' speculation summarizing his observations at the conclusion of (*Continued on page 342*)



As expressed in four out of five interviews, the American worker feels that his job is important. Three-quarters of American workers feel their job is interesting nearly all or most of the time. Essential to our modern industrial form of life is a sense of motion and progress, and self-respect coupled with pride in accomplishing the daily task.

Photo by Harold M. Lambert

THE INSTITUTE GAZETTE

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Foundry Foundations

DEMANDS which World War II made upon the foundry industry disclosed the great need for college-trained men in this field, and the various foundry, trade, and technical associations acting separately and collectively have indicated their intention for supporting a broad program of training in institutions of higher learning. To meet the demands for professional training for the foundry industry, Thomas K. Sherwood, '24, Dean of Engineering, has announced the establishment at the Institute of a foundry program combined with the courses in metallurgy, mechanical engineering, and business administration.

Expansion of the Institute's program in foundry training has been facilitated by the active interest of the Steel Founders Society of America. To aid in providing adequate facilities for teaching and for student research, the Society is installing at M.I.T. a three-phase, electric-arc furnace, as well as numerous other pieces of equipment. In addition, four scholarships at \$1,500 each have been established.

The program is also being aided very materially by a grant for purchase and installation of equipment from the Foundry Educational Foundation, a joint organization for promotion of foundry education in America comprising the American Foundrymen's Association, the Malleable Founders' Society, the Gray Iron Founders' Society, and the Foundry Equipment Manufacturers Association. The Foundation also provides five undergraduate scholarships of \$700 each.

It is hoped that M.I.T. will have one of the finest foundry laboratories for teaching and research in America. The foundry laboratory will be a part of the newly created Division of Mechanical Metallurgy under Professor John Wulff, which also includes the laboratories in welding, hot and cold working, and powder metallurgy. The division is administered by the Metallurgy Department under Professor John Chipman, Head of the Department of Metallurgy, with the assistance of Professors Erwin H. Schell, '12, and C. Richard Soderberg, '20, from the Departments of Business and Engineering Administration, and Mechanical Engineering, respectively.

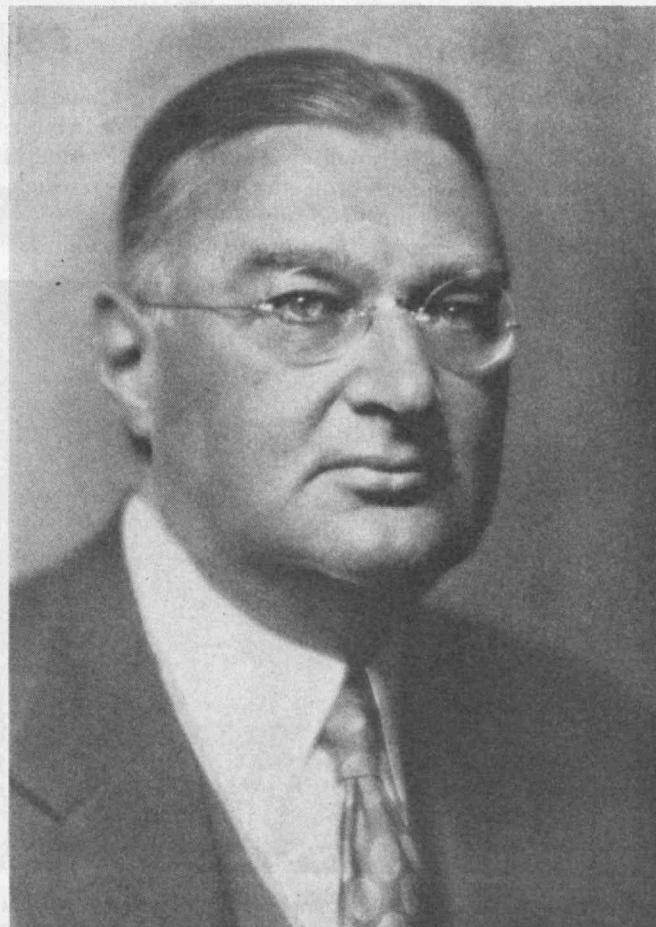
Advanced quantitative aspects of foundry technology will be emphasized in Foundry Engineering, I, Iron and Steel, and in Foundry Engineering, II, nonferrous, a subject which will be developed later after a firm foundation is provided in the prerequisite subjects, Engineering Metals and Metal Processing. Foundry teaching and research will be under the direction of Howard F. Taylor, '24-46, Associate Professor of Metallurgy, formerly of the Naval Research Laboratory, Washington, D. C.

In brief detail a student in any of the three courses, who desires to fit himself for the foundry industry, will make substitutions and elective choices of pertinent subjects, within the framework of standard curriculums. His training will be of the same sound quality regarding science and the humanities as obtained by other students.

Gordon S. Rentschler: 1885-1948

ONE of its most able and valued members was lost to the Institute's Corporation on March 3, when Gordon Sohn Rentschler, Chairman of the Board of the National City Bank of New York, died of a heart attack in Havana, Cuba, while on a much needed vacation.

Mr. Rentschler was born on a farm near Hamilton, Ohio, on November 25, 1885, the son of George A. and Phoebe Schwab Rentschler. He studied in the schools of Hamilton and matriculated at Princeton University from which he was graduated, as president of his class, in 1907. Starting as a laborer in the firm established by his father, he became president of the Hooven, Owens and Rentschler Company and associated foundry and machinery manufacturing firms in Ohio. Among the products of these companies was machinery used in the sugar industry. Mr. Rentschler's duties required him to spend much time in Cuba where he studied all phases of the sugar industry. As a result of his intimate knowledge in this field, his services were sought in 1921 by the National City Bank of New York, which had extensive interests in Cuban sugar. His abilities, enthusiasm, and interest in people were immediately recognized, with the result that



GORDON S. RENTSCHLER

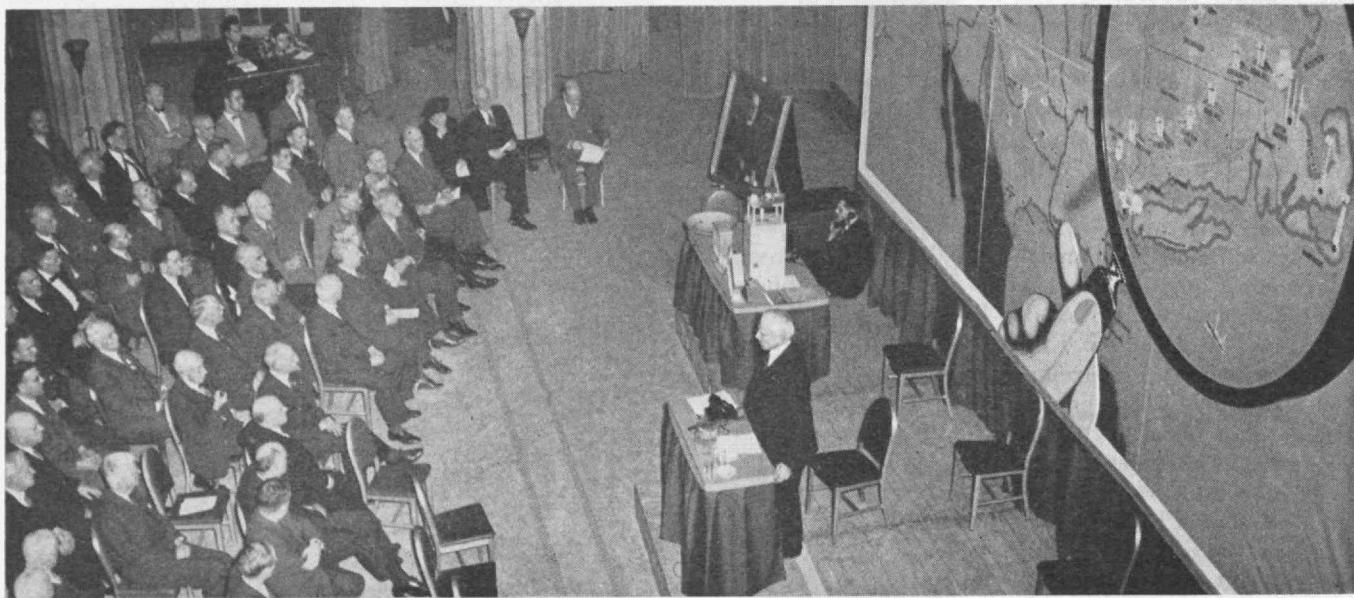
Mr. Rentschler was elected a member of the Board of Directors of the National City Bank of New York in 1923 and two years later was made a vice-president. In 1929 he became president and served in that capacity until he assumed the chairmanship of the board in 1940.

In addition to heading the National City Bank of New York, Mr. Rentschler was a member of many leading corporations, including the City Bank Farmers Trust Company, the International Banking Corporation of New York, the Federal Insurance Company, the Home Insurance Company, and the National Cash Register Company. He was a director and member of the executive committee of the Union Pacific Railroad, a trustee of the Consolidated Edison Company of New York, and recently was elected a trustee of the Carnegie Institution of Washington headed by Dr. Vannevar Bush, '16.

Mr. Rentschler's most active outside interests were his life trusteeships in his Alma Mater and in M.I.T., both institutions of which he served enthusiastically for many years. He was a member of the Visiting Committee on the Department of Geology from 1937 to 1940 and served as its chairman during 1938 and 1939. He was a member of the Visiting Committee on the School of Architecture during 1943-1944, and was chairman of the Visiting Committee on the Department of Aeronautical Engineering from 1941 to 1948. In 1937, Mr. Rentschler was appointed a special term member of the Corporation and was elected a life member in the following year. He served as a member of the Committee on Finance since 1937, and since 1946 was a member of the M.I.T. Executive Committee.

State of "the Union"

SOME 800 Alumni who gathered at Walker Memorial Hall on the evening of February 7 for the Midwinter Alumni Meeting of Metropolitan Boston heard President Compton tell of the progress on current projects on which the Administration is now working. The Review is happy to present extracts from Dr. Compton's address as follows:



Fay Foto Service, Inc.

President Compton relates recent progress at the Institute to Alumni attending the Midwinter Metropolitan Boston Meeting on February 7. The large map was used in conjunction with telephone messages to various parts of the world over radio links (see *The Review*, March, 1948, page 272). At the corner of the platform is the portrait of Dr. James L. Tryon, formerly Director of Admissions at M.I.T., which was painted by and presented to the Institute by Mrs. Tryon.

The new Senior House is under construction although it has been slowed up by the severity of the winter weather. Every effort will be made to have it ready for occupancy by next October, though it may be impossible to meet this schedule.

The foundations are installed for the athletic cage which will provide indoor space 200 feet by 160 feet for year-round athletics. The great roof trusses which are the key features of this building have been received in Boston and the cage should be ready for use by next fall.

Substantial progress has been made in the procurement of funds and equipment for the construction of the new Hydrodynamics Laboratory and Naval Towing Tank. The contributions totaling several hundred thousand dollars have come from several shipbuilding companies, manufacturers of hydraulic equipment, and interested individuals. This laboratory will be a great asset to our Departments of Civil and Mechanical Engineering and Naval Architecture and Marine Engineering.

I am glad to announce that we shall be able next summer to re-establish the very successful program of the Alfred P. Sloan Foundation Postgraduate Fellowships in Business and Engineering Administration which had to be discontinued during the war because the promising junior executives for whose benefit this program was instituted could not be spared from their positions in industry.

One of the most encouraging features of the present situation is the fine manner in which our undergraduate body, through its Institute Committee, has tackled the problem of re-establishing and improving the whole program of student self-government and extracurricular activities which were so much disrupted and partially abandoned during the war period. The students have been very earnest in this effort and their effectiveness has probably been enhanced by the increased experience and maturity which so many of them gained in war service.

The only unhappy feature of my report is the announcement of an anticipated deficit of about a half million dollars in next year's operations, in so far as we can at this time estimate operating income and operating requirements. This financial situation calls for careful and skillful planning by all concerned. It may be recalled, however, that as long ago as 1941 we estimated the reconversion from the accelerated educational program of the war years back to the normal peacetime program would involve a loss of three-quarters of a million dollars. This next year appears to be the time when the major impact of loss will hit us.

BUSINESS IN MOTION

To our Colleagues in American Business ...

To most people, copper is just copper, and a familiar metal that can be handsome as well as useful. Revere, however, offers no less than six different coppers, each one having special qualities that set it apart from the others. One of these is Free-Cutting Copper, which can be much more easily and quickly machined than any other type of the metal. It is therefore an ideal material for the manufacture of machined parts requiring the high electrical or heat conductivity of copper. However, the metal is the highest priced of the six coppers, in cents per pound, and for that reason its economy is often questioned.

That this "expensive" copper is actually the most economical, when machining is involved, has been proved many times. For example, a company manufacturing electrical parts and equipment tried Revere Free-Cutting Copper first on a test basis, and then in standard production runs. Here are some results:

Part A: 5,760 pieces produced in 19.6 hours with no machine down-time, as against 10,425 pieces in Electrolytic Copper run in 66.6 hours with 11.8 hours machine down-time, plus use of three sets of dies. Saving per thousand, \$1.81, including material and labor.

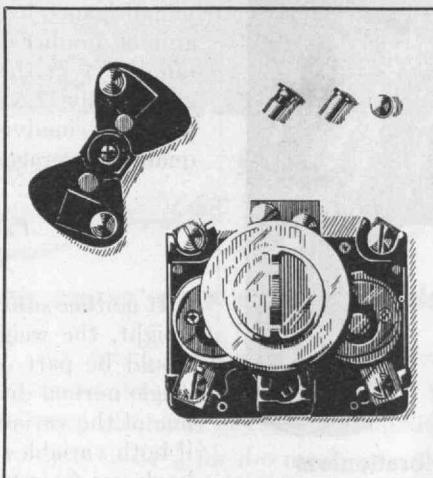
Part B: Saving per thousand, 77¢, including the material difference and direct labor. In addition, a saving of 18% in machine down-time.

Parts C & D: Both were redesigned, to eliminate a facing operation formerly required, now unnecessary due to the smooth surfaces produced in Free-Cutting Copper. No direct comparison is possible, but estimates are that these parts are being made four times as fast as they could be in Electrolytic.

In general, this customer found that there is a saving of at least 25% in machine time when using Free-Cutting Copper. Another important factor is worker enthusiasm; they like the metal because they no longer have to keep a constant close watch on the work to see that the turnings do not become tangled with the moving parts of the machine.

Thus it can be seen that Revere Free-Cutting Copper, though seemingly expensive per pound, is actually the most economical where machining is involved. In other words, we have here another example of the fact that "the best is the cheapest." Sup-

pliers in every industry offer materials at varying prices, and it is suggested that no matter what you make, nor from whom you buy, it will pay you to investigate what is really "best" for your purposes. Price is not necessarily a guide to true economy. If you will permit your suppliers to study fabrication processes and end uses, perhaps from such mutual collaboration will come new ideas for reducing costs.



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THE MATHEMATICS OF LIFE

(Continued from page 315)

the same vitamin D-free ration, but is exposed to sunshine (sunshine of sufficient intensity and duration generates vitamin D by activating precursors in the surface tissues). The second experimental group is shielded from sunlight, but is fed a ration with a certain amount of a particular form of vitamin D added. The objective is to determine the effects, if any, of the two sources of vitamin D. In an actual study several characteristics would no doubt be observed, but the table has been limited to a record of body weights.

As the table indicates, the animals were selected so that average weights of all three groups at the outset were approximately 28 kilograms. However, as the individual weights show, separate animals weighed as little as 26.0 and as much as 29.6 kilograms. Six months later the control lambs had gained an average of 10.8 kilograms; those in the sunshine group, 12.4 kilograms; and those in the vitamin D group, 14.2 kilograms. Since both experimental groups show greater average gains than the control group, a hasty conclusion might be drawn to the effect that both sunshine and vitamin D had promoted growth. But note again the wide variation among individual gains in any one group. Furthermore control animal number 2 gained 13.2 kilograms, whereas animal number 1 in the group with the highest average gain gained only 12.5 kilograms. This observation alone underlines the inadvisability of basing conclusions on unqualified averages.

Procedure for Evaluating Significant Differences

If neither sunshine nor vitamin D had any effect upon weight, the weights of the animals in all three groups would be part of the same universe, represented by a single normal distribution curve. If, on the other hand, one of the variables had an effect but the other none, or if both variables had identical effects, the animals would be drawn from two universes, each having a separate and characteristic normal distribution curve. Finally, if the two variables had two different effects, quantitatively, each of the three groups would belong to a different universe, hence to a different normal distribution. A procedure based on this principle makes possible evaluation of significance of the differences among the group averages. The result, identified as the probability or *p* value, is a measure of the probability that observed differences are due to chance factors, that is, factors other than those controlled experimentally.

The table shows that the sunshine group gained an average of 1.6 kilograms more than the controls. However, this difference has a probability or *p* value of 0.24, which means that the observed difference might be the result of chance factors 24 times out of 100. Contrariwise, the 3.4-kilogram difference between the average gain of the control group and that of the vitamin D group has a probability of only 0.006. This signifies that only six times out of a thousand would a difference of this magnitude, between experimental groups of this constitution, be attributable to chance. The table on page 315 shows, of course, the results of a hypothetical experiment.

(Continued on page 330)

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THE MATHEMATICS OF LIFE

(Continued from page 328)

Observe that categorical answers are not provided, because in actual studies zero values of probability are not obtained, so that it can never be said that a particular difference could not be due to chance. Nevertheless, when, as in the difference between the average values of the control and vitamin D groups, chance might account for the observed difference only six times out of a thousand, an observation has been obtained that is a reliable basis for general conclusions. In contrast, when as in the other group-average difference of our hypothetical experiment, chance might be responsible for the observed changes as many as 24 times out of 100, little light has been shed upon the true effect of the variable under study. Thus the hypothetical study showed conclusively that vitamin D added to the ration, in the form and quantity used, increased rate of weight gain during the age period observed. With regard to the effect of sunshine, a conclusive answer did not result. A real increase in rate of gain may have been produced by sunlight exposure, but if so it was too small to be revealed significantly with the number of animals studied, having variability in initial weights and in rates of gain as shown.

This last observation points up an application of statistical procedure fully as important as the one of interpreting experiments; this is the application of setting up studies. With knowledge of certain characteristics of the experimental organisms and of the problem at hand, it is

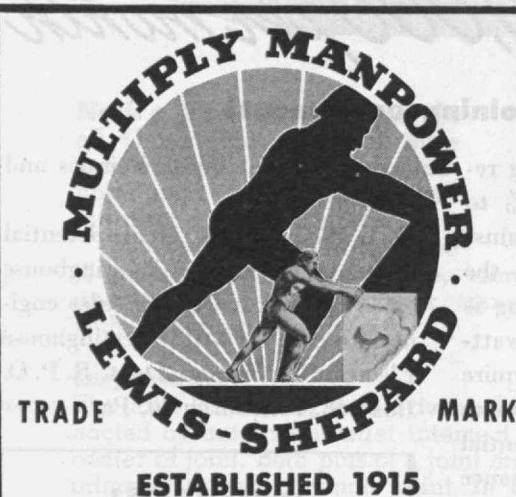
possible, by ramifications of the technique demonstrated, to establish in advance the size of experimental and control groups required to obtain conclusive results. Thus the biologist has a technique for making effective, economical use of experimental methods and results.

Other Applications

The procedure just demonstrated is but one facet of an extensive statistical methodology. This method and related ones, and still others based on different concepts, find everyday use in bacteriology, immunology, pharmacology, physiology, nutrition, taste and odor tests, agriculture, and animal husbandry. Nor is the utility of statistical procedures confined to the laboratory branches of biological research; such methods are indispensable in fields like demography, epidemiology, market research, psychology, and education.

Statistical analysis gained wide use in an engineering field, quality control of the mass production of materials having mechanical specifications, as a result of the unprecedented demand for precision products generated by World War II. Tolerances from exact dimensions or other specifications must be accepted if such products are to be made at high speed. Although tolerances do not detract from utility of the products when held within suitable limits, they make it difficult to know whether the manufacturing process is being satisfactorily regulated. In the absence of such regulation, product characteristics may suddenly begin to exceed allowable tolerances, resulting

(Concluded on page 332)



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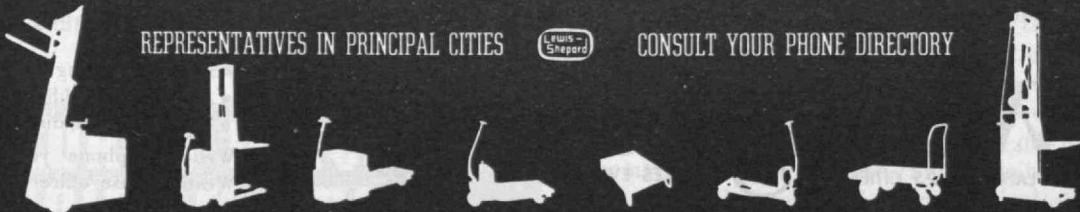
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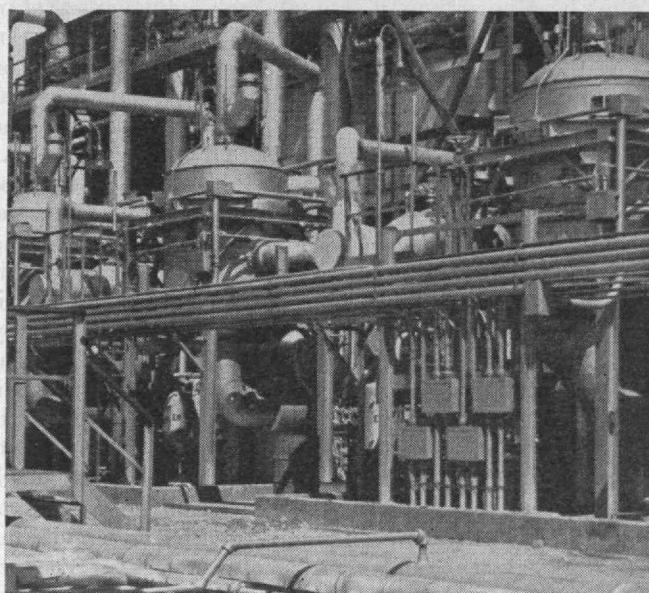
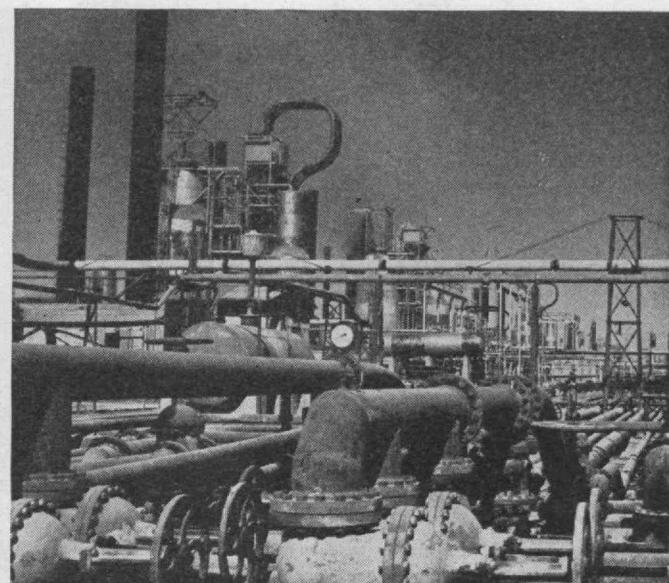
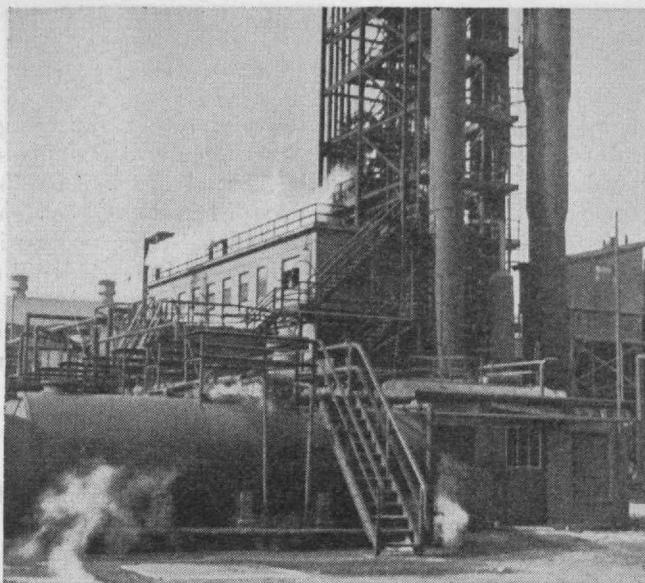
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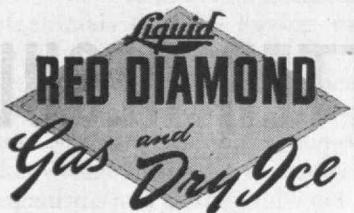
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THE MATHEMATICS OF LIFE

(Concluded from page 330)

in rejection of an undue proportion of output. But recognition of the fact that mechanical characteristics of mass-produced materials follow the normal distribution (or other mathematically definable distributions) has enabled rigid control to be exercised. First the process is studied intensively to establish limits of the distribution. Subsequently periodic spot checks of products are made; only when variability exceeds the limits of the established distribution need trouble be suspected and looked for.

Properly Used, Statistics Can Save Lives

Even in the biological fields where statistical methods first proved their value, these methods have still to attain their full utility. Consider the medical sciences alone: clinical studies are extreme examples of research that must be done with limited numbers of individuals. Yet in the absence of statistical procedures physicians have been forced to evaluate their results by means of estimates, often of a highly subjective nature, based upon observations of a few patients. But in the field of medicine adoption of statistical methods is advancing apace. At the last meeting of the American Public Health Association, for example, a statistical procedure called the apportionment method was offered for use in evaluating treatment of conditions such as advanced cancer. This method was proposed as an improvement over the classical alternate case procedure, whereby standard therapy and a new treatment are tried on alternate patients as they are admitted to the hospital. Either procedure ultimately reveals equally well which of the two treatments is the better; but the apportionment method permits application of accumulating knowledge as it is gained, rather than waiting until the conclusion of a series to decide which treatment is more effective. By reviewing clinical experiences in which the alternate case procedure had been used, the originator of the apportionment method was able to show that, in the light of how patients had fared on standard and experimental therapies, significant reductions in mortality could have been accomplished by use of the apportionment method.

Thus further development of statistical procedures, and their wider application to the biological sciences, may be expected not only to promote human welfare but actually to extend the human life span.

BIBLIOGRAPHY

For guidance in understanding statistics, without consideration of theory:

Butsch, Russell L. C., *How to Read Statistics* (Milwaukee, Wis.: Bruce Publishing Company, 1946), \$2.50.

Elementary theory, without mathematical derivations:

Smith, G. Milton, *A Simplified Guide to Statistics for Psychology and Education* (New York: Rinehart and Company, Inc., 1946), \$1.25.

More detail about theory and derivations:

Fisher, Ronald A., *Statistical Methods for Research Workers*, 10th edition (Edinburgh: Oliver and Boyd, Ltd., 1946), 16s.

Statistical methods for manufacturing quality control:

Shewhart, Walter A., *Statistical Method from the Viewpoint of Quality Control* (Washington: United States Department of Agriculture, 1939).

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ÉVARISTE GALOIS

(Continued from page 318)

lieutenant-general of the Kingdom, and in 1830 he was proclaimed King. Here was an intelligent man, kind of heart but of feeble character. The discontented people whose rights were reduced to almost nothing by his two predecessors showed their rage everywhere. It was in these stormy atmospheres that Galois lived, suffered, and worked at his mathematics.

Galois' struggles with politics led him to hope that he would find sympathizers, and so he wrote a letter to the *Gazette des Écoles* intended for the students and principal. He said, therein: "I ask nothing of you for myself, but speak out for your honor, and according to your conscience." There was no answer because those to whom he made his appeal probably had neither of the virtues he believed they had, or should have had if they were free men. Rejected, he turned to his real work.

Galois had been expelled from the École Normale and was now destitute. Food and lodgings were offered but he refused to accept charity. He lived on what he could gather at the poor restaurants in the neighborhood of the Pantheon and slept on benches on the *quais*. He tried to deliver lectures in the rear of Caillot's book shop in the Rue de la Sorbonne. He offered lessons in advanced algebra but found few pupils. These lessons were to have included Galois' imaginaries, the theory of the solution of equations by radicals, and the theory of numbers and elliptic functions treated by pure algebra. All of these were his original work. He tried very hard to sell the gold taken from his own mind to the intellectual market but there were no buyers. His great and brilliant discoveries went begging for asylum.

It was at this time that the academician Poisson offered encouragement to Galois and requested a memoir for the Academy of Sciences. At the request and encouragement of the academician Poisson, Galois took new hope, recast the memoir he had sent to Fourier, and submitted the new memoir to the Academy of Sciences on the "General Solution of Equations," known today as "The Galois Theory." Poisson kept this manuscript for four months and then, after several reminders by Galois, returned it to him with the brief single word "incomprehensible." This was, to say the least, an unusual decision for a man of the stature of Poisson. How could he have reached such a conclusion if he had really studied the memoir? Perhaps it went beyond his understanding and he spoke his innermost and honest conviction when he said that it was, to him no doubt, incomprehensible! This decision was a great blow to Galois who now began once more to devote his efforts to revolutionary politics. He preambled his revolutionary conflagration with these words: "If a carcass is needed to stir up the people, I will donate mine." And now he commenced to stir things in politics as if this were needed.

On May 9, 1831, some 200 *Républicains* held a banquet protesting against the royal order disbanding the artillery of which Galois was a member. Toasts were drunk to the Revolution, and here Galois, glass in one hand and an open pocketknife in the other, rose from his seat shouting, "To Louis Philippe." This denunciation frightened some of those present and they left — including Alexandre Dumas who escaped via an open window. But a majority

(Continued on page 336)

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ÉVARISTE GALOIS

(Continued from page 334)

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of the younger *exaltés* approved his threats, repeated after him, "To Louis Philippe," and finally finished the evening by dancing around the Column Vendome. Galois became a hero for the moment but the following day he was arrested in his mother's home and put in prison.

A clever lawyer devised an ingenious defense based on the claim that Galois had in fact said, "To Louis Philippe — if he turns traitor." The presence of the open knife was easily accounted for by saying that Galois was using it to cut chicken. During the trial Galois showed a contempt for the court and his accusers and launched a hot tirade against the forces of political injustice. The judge, touched by the thought of his own children, warned him that he was not helping himself and even silenced him. The prosecutor argued over the question of whether or not the restaurant was a "public place" when used for a semiprivate banquet. On this point of the law hung the liberty of Évariste Galois. After a short deliberation the jury, moved by the youthfulness of the defendant, returned a verdict of "not guilty." Galois picked up his knife, slipped it into his pocket, and left the court room without a word. Was this the end of his troubles? Hardly.

Less than a month from the date of his liberation he was again arrested as a precautionary measure. The *Républicains* were to hold a celebration and Galois, being considered a dangerous radical in the eyes of the police, was locked up on no charge whatsoever. The newspapers played up the brilliant coup of the police who had, as they said, now caught in their net "the dangerous *Républicain* Évariste Galois and had placed him where he could not start a revolution." Finding no valid charge against him the police accused him of illegally wearing his artillery uniform, even though the artillery had been disbanded. Nevertheless Galois was convicted and sentenced to imprisonment for six months. His sister, who saw him at this time, said he looked 50 years of age. It should be remarked that political prisoners were treated with reasonable kindness and, for them, the prison discipline was light.

The last letter he wrote was on May 29, 1832, and was addressed to all *Républicains*. On the margin of this letter he wrote these words: "I have not time, I have not time." History unfortunately does not say what happened to him, but what he wrote in those last hours before dawn will keep generations of mathematicians busy for centuries. The question he asked was: Under what conditions can an equation be solved by radicals? For the answer Galois employed his theory of groups. He was one of the great pioneers in this abstract theory which is of fundamental importance in all mathematics and many branches of physics, including quantum theory — and he was only 20.

Even in love Galois was unfortunate and perhaps also misguided. In this connection at an early hour on the morning of May 30, 1832, Galois fought a duel with pistols. He fell, shot through the intestines, and was left lying where he had fallen. A peasant who found him near what was then the Étang de la Glaciere on the territory of Gentilly, took him to the Cochin Hospital in Paris where he arrived still in possession of his faculties and before peritonitis set in. He refused the offices of a Catho-

(Continued on page 338)

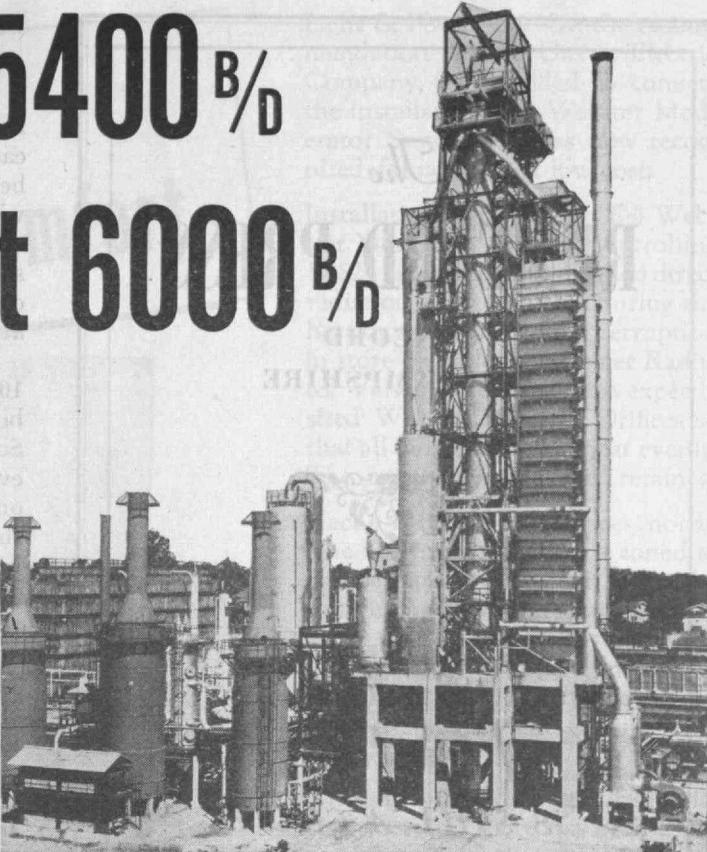
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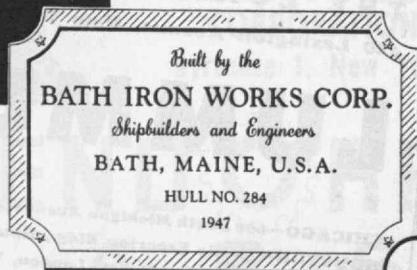
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ÉVARISTE GALOIS

(Continued from page 336)

lic priest, perhaps remembering that the clergy was the cause of his father's death. His younger brother, who had been forewarned, arrived in tears. Galois comforted him with a show of bravery. "Don't cry," he said, "I need all my courage to die at twenty." Yes, this boy with somber face, abstemious habits, and perpetual air of concentration died when most youths just begin life—at 20.

Évariste Galois passed away on May 31, 1832, at 10:00 A.M. not having yet attained his twenty-first birthday. He was buried in the common grave of the South Cemetery of Paris where today no trace remains of even the charity-given grave which once held the body of one of France's mathematical luminaries. He willed to the world a rich and enduring monument in his collective works.

To his friend, Auguste Chevalier, Galois addressed his will which began: "My Dear Friend, I have made some new discoveries in analysis," which he outlined, concluding with the remark, "Ask Jacobi or Gauss publicly to give their opinion, not as to the truth but to the importance of these theorems. Later, there will be, I hope, some people who will find it to their advantage to decipher all this mess. *Je t'embrasse avec effusion.* E. Galois." In one of the letters to Chevalier was a résumé of the whole of his contributions to mathematics. That letter, fortunately, is preserved. It contains seven pages and is one of the most precious documents in the important science of mathematics.

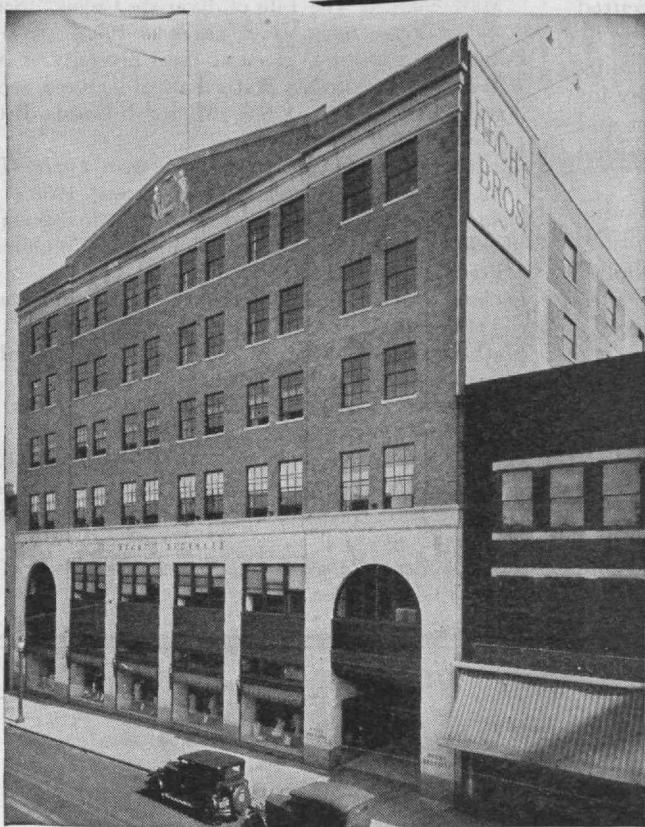
Even now there are still many seeking "to decipher" what Galois dared to call "this mess." Too bad that he did not live longer for if he had, he would perhaps have left a greater mass of his golden "mess." Évariste Galois was right in saying that some people would find it to their advantage to decipher his rich heritage. Many are still picking nuggets from the vein of the mine he left behind. Galois' scientific executor, Joseph Liouville, in 1856 edited some of the manuscripts for the *Journal des Mathématiques Pures et Appliquées*. Singled out for special mention is the following gem from Liouville's comments: "My zeal was well rewarded, and I experienced an intense pleasure at the moment when, having filled in some slight gaps, I saw the complete correctness of the method by which Galois proves, in particular, this beautiful theorem: In order that an irreducible equation of prime degree be solvable by radicals it is necessary and sufficient that all its roots be rational functions of any two of them."

Perhaps the importance of Galois' work may be emphasized by stating that shortly after Galois' death, there appeared the following two important proofs, based on his work: (1) It is impossible to find formulas for the general fifth-degree equation similar to those which solve the quadratic equation, using only roots and elementary mathematical operations; (2) It is impossible to trisect an arbitrary angle by using only a compass and straight edge. The first of these important proofs was enunciated by Abel to whom Galois had been compared; the second by Wantzel.

Paul Dupuy in his *La Vie d'Évariste Galois* eulogizes him as follows: "At least the grave did not take him

(Concluded on page 340)

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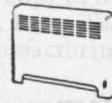
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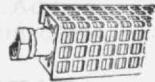
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ÉVARISTE GALOIS

(Concluded from page 338)

entirely; the few pages which he left have sufficed that his country knows his name. His real country, the most beautiful and the grandest of all, the one in which those rigorous and profound conceptions necessarily fraternize, the world of Mathematics, all the noble intelligence of which is spread over the entire world. If, as he said, immortality is only a path left in the memory of men, he is assured of this immortality so long as man remains on earth. Unknown to the masses yet his name is secured against forgetfulness by the admiration of an elite. It is for these that I have written this study, in wishing to add to my admiration of the genius, my sympathy for his passionate soul, the racked and tormented heart and finally to erect alongside of his name, which represented but ideas, the living figure of a man."

The world owes a debt to Monsieur Dupuy for having brought to life the boy and man Galois. Our own praise and appreciation of Galois may be summed up as follows: The miner has disappeared but the rich mine which he uncovered and worked all his life he left not to his country alone but to the world. Men who have carried the swords of war have been knighted and raised on high pedestals of fame. Should we not, at least, do something to commemorate the name of him who brought us the key called mathematics which opens the portals to all of man's exact knowledge?

It would certainly be paying a fitting tribute to erect in the court of the École Polytechnique in Paris a monument on which should be inscribed this simple text:

Évariste Galois
Mathématicien de Génie
1811-1832

BIBLIOGRAPHY

- Annales Scientifiques de l'École Normale Supérieure, 3eme Série, Volume 19, 1896.* The life of Galois is given in this publication, written by P. Dupuy, with notes edited by Jules Tannery. The entire text of this original contribution in the *Annales* is reprinted in *Cahiers de la Quinzaine*, October 27, 1903, pages 5-104.
- Davidson, Gustav, "The Most Tragic Story in the Annals of Mathematics; The Life of Évariste Galois," *Scripta Mathematica*, June, 1939, VI: 2, pages 95-100.
- Emil, Artin, Lectures given at the University of Notre Dame.
- Milgram, Arthur N., Mathematical lectures, second edition, supplement. (Ann Arbor, Mich.: Edwards Brothers, Inc., 1942.)
- Carlitz, Leonard, *Galois Fields of Certain Types*. (Philadelphia, Pa.: University of Pennsylvania [thesis], 1930.)
- Dehn, Edgar, *Algebraic Equations; An Introduction to the Theories of Lagrange and Galois*. (New York: Columbia University Press, 1930), \$4.25.
- Dickson, Leonard E., *Theory of Algebraic Equations*. (New York: John Wiley and Sons, 1903.)
- Mathews, George B., *Algebraic Equations*. (Cambridge, England: Cambridge University Press, 1930.)
- Bell, Eric T., *Men of Mathematics*. (New York: Simon and Schuster, 1937), \$5.00.
- Fink, Karl, *A Brief History of Mathematics*. Translated in English by Wooster Woodruff Beman and David Eugene Smith, 1910. (LaSalle, Ill.: Open Court Publishing Company), \$1.50.
- Steinitz, Ernst, *Algebraische Theorie der Körper*. (Berlin, Germany: de Gruyter, 1930.)



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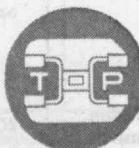
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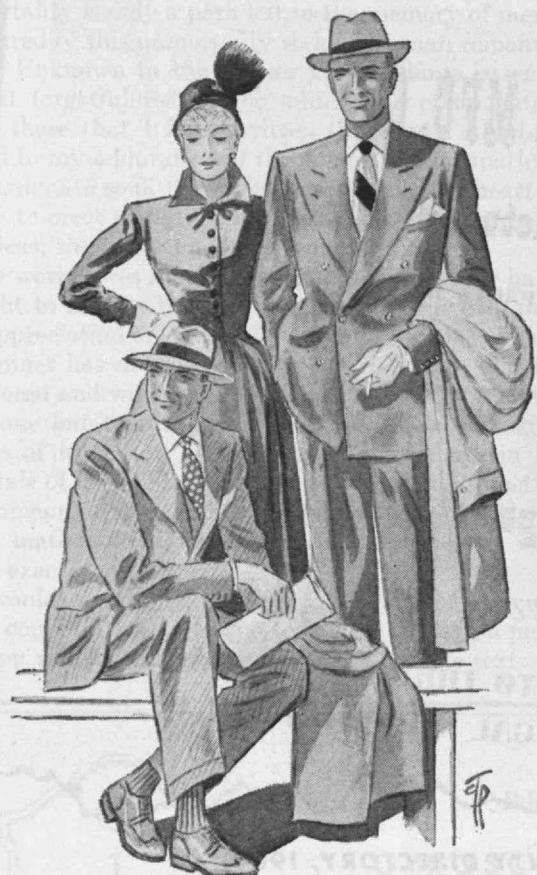
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WHAT'S ON THE WORKER'S MIND?

(Continued from page 324)

World War I is still relevant: "It is impossible to help wondering if the unions would have grown to anything like their present size if all the managers who find them so serious a problem had felt more seriously how keenly this problem of the daily job touches the life and soul of the worker."

The union movement has come to assume the fundamental importance in the eyes of the worker which attaches to the job itself. This sense of the significance of the union arises, of course, from the fact that it is intended to serve as a job-security device.

The polls show a willingness among workers to endorse unions, although such support is qualified. In the winter of 1942 Roper submitted a check list of two positive and two negative statements. Three-fourths of the union members checked statements indicating they would give unions more power or would support them despite their mistakes, while nonunion workers were divided rather closely (42.7 per cent and 48.4 per cent) on the positive and negative propositions respectively. In May, 1942, Gallup formulated the categoric question: "Are you in favor of labor unions?" Nationally, two out of three people in the United States said "yes." Among the workers, the skilled workmen's percentage of "yes" answers was 75; that of the unskilled, 71.

Union Support Qualified

Despite this willingness to back unions, American workers qualify their support of unions in many ways. In the late spring of 1940 Roper found that a few workers (7.0 per cent) thought that all unions are headed by persons with purely selfish motives. But a third (34 per cent) of the workers said that some unions are so led, one-eighth (13 per cent) believed that about one-half of the unions are, and one-fifth (20 per cent) of the workers felt that most unions are selfishly administered. The statistical summaries of the poll data follow this same pattern of differentiated responses to questions about the efficiency and honesty of union management, about the manner in which unions keep their promises, about the use of threats of violence in gaining members. Worker opinion is divided, and so is union opinion, apparently, on these issues. A similar split appears in the statistical tables setting forth responses to questions concerning union tactics. On the basis of polls conducted in June, 1940, June, 1941, August, 1945, and November, 1946, the reports of the Roper and Gallup agencies display a lack of uniformity. In fact, there is evidence of a wider scatter

(Continued on page 344)

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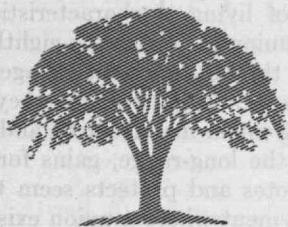
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WHAT'S ON THE WORKER'S MIND?

(Continued from page 342)

of opinions on such matters as picketing, union dues, denial of work in a time of strike, strikebreaking, closed shop, and work-restriction practices.

Nevertheless, in the poll data on questions of economic advantage — for example, working hours, wages, and working conditions — the union workman appears to be a typical economic man and willingly supports leaders and organizations which promise to protect his immediate economic welfare. To the question, asked by Gallup in the winter of 1946, whether or not the demand of labor leaders for a wage increase of 20 per cent was in line with the costs of living, a characteristic response was made. Of labor union members five-eighths (62 per cent) of them agreed that the increased wage demands were justified. In spite of any reservations they might want to make concerning union management and tactics the immediate, if not the long-range, gains for the job which the union promotes and protects seem to lead workers to prefer employment where a union exists.

Labor Views the State

Tradition among American laborers calls for opposition to government interference in industry: at least it did until the factors associated with the New Deal and the rise of the Congress of Industrial Organizations made their appearance. The older tradition of noninterference is not completely dead, for it manifests itself in certain attitudes expressed in the public polls. But on the whole, American labor seems to have broken with tradition and now looks to the state rather than the group for solutions to its problems.

Like many other American citizens, the workers appear to have cast aside self-restraint and discipline in favor of a law which will do this, or a law which will prevent that. Thus, Gallup announced in June, 1944, that labor sentiment was in favor (64 per cent) of a law to prevent strikes in war industries. In the late spring of 1941 Roper found labor ready (68 per cent) to support a government agency with the power to force settlement of differences between employers and employees. In the fall of 1946, according to Roper, a third of American unionists approved a do-nothing policy (aside from preventing violence) in a specified labor dispute, 28 per cent approved of "friendly offices" overtures by government, and a third sanctioned arbitration or intervention. These samples are excellent indices of the manner in which labor is willing to support laws, even those controlling collective

(Continued on page 346)



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WHAT'S ON THE WORKER'S MIND?

(Continued from page 344)

bargaining situations. They also bring out the traditional reserve with which the American laboring population regards its government.

Like most Americans, however, the workers are aware of the importance of bringing pressure on government for desired ends, and they have definite feelings as to who brings pressure. Roper inquired, in the fall of 1946, as to what group puts the most pressure on Congress to get what it wants. Labor unionists thought that businessmen do, and businessmen, of course, thought that labor does. Characteristically enough, each side felt that Congress pays more attention to the other side. The scramble for government assistance is certainly a part of labor — and general public — ideology; but the various groups in the American public are apprehensive, and jealous, of the amount of aid being given the respective claimants by government.

Labor Unions in Politics

Two out of three factory workers (68.2 per cent) told Roper representatives in the winter of 1943 that they thought "our form of government works well and only a few changes, if any, should be made in it." A fourth of them checked a statement that "it needs to be thoroughly revised to meet present-day conditions." American unionists have long held a policy of no political participation, other than rewarding friends and punishing enemies at election time. This view is still strong. Roper's field men were advised by more than one-third (37.7 per cent) of all union members that labor unions should stay out of politics. On the other hand, more than one-fourth (29.9 per cent) said that unions should support major political parties. Only one union member in five supported the formation of a labor party, though members of the American Federation of Labor and the Congress of Industrial Organizations differed on this issue.

This withdrawal attitude, sometimes labeled Gompersism, applies only to politics, however, and not to the scope and activity of the government itself. For example, the American Leadership Panel sought to know what labor responses would be to the question: "Whom do you hold primarily responsible for assuring job opportunities to returning veterans?" In two-thirds (64.4 per cent) of the interviews, labor told Panel representatives that government should assume this responsibility. Like many other American citizens, workers in this country seem to favor a positive state program. Thus according to a poll made by Gallup in the fall of 1945, slightly more than half of them (52 per cent) believe in a law requiring employers to hire a qualified person, regardless of race or color; no other group polled showed so high a percentage. In the winter of 1945 the National Opinion Research Center discovered that 65 per cent of the workers — protective, personal, manual, and skilled — would like to see government decide what is a fair profit for big business. A smaller percentage (53 per cent) felt the same way about small business. As in so many proposals touching directly on economic gains, the wage earners in this country informed Gallup in the summer of 1945 that they would favor making the minimum wage \$0.65 an hour for all workers in business and industry.

(Continued on page 348)

WILLIAM B. JADDEN—LOS ANGELES, CALIFORNIA



*Another post-college
career story*

J
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L

Two months before my release to inactive duty from the Navy, I began to think seriously about a peacetime career. I had a Master's degree in business administration, and almost four years of supervisory experience with a leading aircraft concern in Los Angeles. But I realized that going back to the aircraft company might mean the same kind of seniority drawbacks as in the Navy, and my earnings wouldn't necessarily be in direct proportion to the work I put in. Besides, the idea of working for myself appealed to me more strongly than ever.

My first thought was to start a business of my own. But that would take a much larger investment than I could possibly make.

About this time I recalled some New England Mutual advertisements I had read in the Princeton Alumni Weekly, which reached me regularly overseas. I began to ask myself whether life insurance wouldn't give me more than just another job. So I wrote the New England, and several other companies, for more information. The more I looked into it, the more I liked the idea of this business.

When I got back to Los Angeles as a civilian, I called on the agencies of the six companies I regarded as tops in the field. I began a very lengthy analysis of the pros and cons of going into the business. My investigation convinced me that life insurance offered just about everything I was looking for--something in which I'd be my own master without making a heavy investment, where hard work couldn't help but increase my earnings, and where I'd never have to ask for a raise. I became convinced, too, that the New England Mutual was the Tiffany of life insurance companies.

I took the aptitude test, then basic training here in our agency, followed by a comprehensive course* at the Home Office in Boston. Now, after qualifying for membership in the Company's Leaders Association in my first year, I can definitely say that I am happy I made this choice. The proof, I think, is that I have never once had the well-known feeling that "the grass is greener on the other side of the fence."

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Facts such as these helped Bill Jadden solve his career problem. If you'd like to know more, write Mr. H. C. Chaney, Director of Agencies, New England Mutual Life Insurance Company, 501 Boylston Street, Boston 17, Massachusetts.

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WHAT'S ON THE WORKER'S MIND?

(Continued from page 346)

Almost 30 years ago, Whiting Williams noted among American workingmen "a conviction that, for them, there is no chance to break through on the industrial sector." The turn to the state in recent years is unquestionably related to this feeling.

The Security Motive

It would be useless to pretend that the polls tell us completely and accurately what's on the worker's mind, any more than does this résumé. Any person's claim to such information is obviously very dubious. In an age of machined and mass communication *vox populi* has become a rather meaningless phrase.

Williams came back from his own opinion survey with the overwhelming sense that the problem of security loomed large and menacing in the postwar America of his day, most of all among industrial workers. It still does.

In August, 1946, Gallup asked: "Do you think that there will be a serious business depression in the United States within the next ten years?" Among the general public the affirmative answers amounted to 60 per cent; among the manual workers, 56 per cent.

In the winter of 1942 Roper presented workers with the choice of selecting one of three different kinds of jobs. A job that pays quite a low income but which one might be sure of keeping attracted 55 per cent of the factory workers and 67.2 per cent of the personal service workers. Only 15.2 per cent of the former and eight and three-tenths per cent of the latter preferred a job that pays an extremely high income if one makes the grade but in which one loses almost everything if he does not make it. There was little difference between the choice of factory workers in general and that of union members. Low-paid security jobs appealed to southern Negroes (83.3 per cent), low-salaried workers (68.3 per cent), workers preferring employment with a small rather than with a medium-sized company, and the uninformed workers.

A definite pessimism pervades the ranks of American labor about security by means of their jobs. In the spring of 1947 Roper found that factory workers had mixed emotions about their ability to retire in reasonable comfort when they become 65 years of age. Four out of ten (42 per cent) thought it "likely" and four out of ten (41 per cent) also thought it "unlikely" that they would be able to do so. Pessimism was greater among Negro (48 per

(Concluded on page 350)

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WHAT'S ON THE WORKER'S MIND?

(Concluded from page 348)

cent) than among white workers (41 per cent). As might be expected, those workers over 40 were less confident than those under 40 years of age. C.I.O. unionists were less certain (35 per cent) than A.F.L. members (45 per cent).

The Roper poll in the winter of 1942 revealed a marked tendency among factory men (54.2 per cent) and factory women (46.2 per cent) to stay in the industry in which they were employed during the next five years. Only one out of ten expected to go into business for himself, and two and two-fifths per cent anticipated a change into "some kind of white-collar job." Five years later Roper asked: "Do you think the years ahead seem to hold for you personally a good chance for advancement?" Factory workers and union members divided rather evenly on the question. The former group said, in 47.7 per cent of the interviews, that they had a good chance, in 40.7 per cent that they saw little improvement over their present position. The percentages for union members were 48.7 and 41.2.

According to the polls, American workingmen are not prepared as yet, however, to accept the doctrine of the maturity of the American economy. In November, 1939, they were asked by Roper whether they believed: "(1) that the great age of economic opportunity and expansion in the United States is over? or (2) that American industry can create a comparable expansion and opportunity in the future." Factory workers were less confident (69.6 per cent) of expansion than the general public (71.7 per cent), but both obviously had great expectations and were unwilling to accept the maturity thesis.

Perhaps behind this optimism lies the recognition that "the thread of self-respect and standings and statuses," as Whiting Williams put it, "ties the world of modern society together," and that this thread is bound securely to the prospect and realization of social and economic improvement. "The main thing," wrote Williams, "is the sense of motion and progress."

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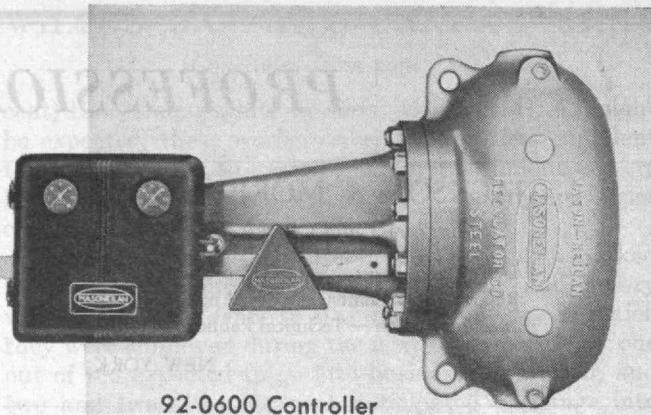
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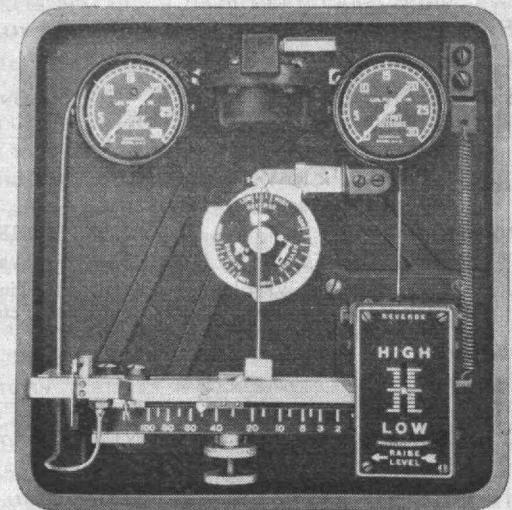
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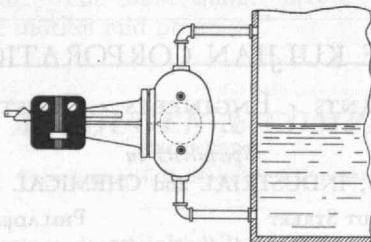
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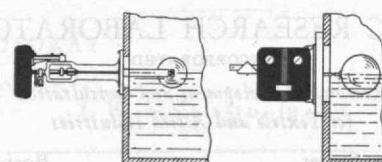
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At the Boston midwinter meeting in February, President Compton, reporting on current conditions at M.I.T., concluded his remarks with an appreciation of the importance of the Fund and its significance:

"... a note of appreciation of the splendid growth of the Alumni Fund. It was only a few years ago, under the presidency of B. E. Hutchinson, that he made a strong appeal to reach an annual goal of \$150,000. Our Alumni Fund Director informs me that this year for the first time we have passed the \$200,000 mark, and with nearly two months to go till the end of the Fund year. For continuing broad-base support and the provision from time to time of urgently needed facilities, these generous contributions by the Alumni are not only of great significance in themselves but of great encouragement to all of us who are interested in the effectiveness and improvement of our institution."

In another month a complete report of the 1947-1948 Fund will be in your hands. It will show, among other things, an average contribution of approximately \$21.00, a decided improvement over the first year's figure of \$8.30, but still below the national average of all men's colleges (\$26.13) and that of the technological colleges (\$23.51). It will show the outstanding performance of the Class of 1897, which, on the occasion of its 50th reunion, gave an unprecedented total through the Alumni Fund. You will find the Annual Report an interesting document and encouraging evidence of continued progress.

A new year is upon us. No matter what course the world may take, one thing is certain. M.I.T. needs your continued support. Its financial problems are many and are becoming increasingly complex. We, the Alumni, have an opportunity to help in smoothing its path. Let us continue to provide that assistance which, in President Compton's words, is "of great encouragement to all of us who are interested in the effectiveness and improvement of our institution."

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M.I.T. Club of the Lehigh Valley

This Club was organized on September 24 at a meeting of 19 Alumni representing Bethlehem, Allentown, Easton, Reading, Palmerton, and Philipsburg. The following officers were elected: President, E. J. Flynn '19; Vice-president, P. V. Cogan '13; Treasurer, Allison Butts '13; and Secretary, M. V. Herasimchuk '39. The first general meeting of the Club was held on December 4 at the Hotel Traylor in Allentown, Pa. Ralph Jope '28, Treasurer of the Alumni Association, was the principal speaker and gave a splendid review of Technology of the past and present. His summary was ideal for this first meeting of 38 Lehigh Valley Tech men.

The second meeting of the current season was held on February 19 at the Hotel Easton in Easton, Pa. Professor Charles E. Locke '96, Alumni Secretary, gave a humorous review of the mining engineering experiences accrued over his long career. Ernest C. Crocker '14, the Club representative on the Alumni Council, made the trip from Cambridge and presented a coffee talk on "Nonalcoholic Beverages."

The third meeting of the 1947-1948 season will be held on May 6 at the Hotel Bethlehem in Bethlehem, Pa. This will be the annual meeting, at which President Compton of M.I.T. will be our guest. After dinner with the Alumni, Dr. Compton will address a joint meeting of the M.I.T. Club and the Engineers Club of the Lehigh Valley in the Packer Auditorium on the Lehigh University campus.—MICHAEL V. HERASIMCHUK '39, Secretary, Post-Office Box 495, Bethlehem, Pa.

M.I.T. Club of Western Pennsylvania

A high point in the activities of the Club was attained on February 16, when Alumni and friends had the unusual pleasure of hearing James R. Killian, Jr., '26, Executive Vice-president of the Institute, address both the regular Monday luncheon meeting and the monthly dinner meeting held in the evening.

At the noon meeting, Dr. Killian spoke before the Hungry Club, a Pittsburgh forum of more than 40 years' standing, which is open to the public. During recent weeks our Club has been meeting with the Hungry Club for luncheon on Monday. On February 16, 45 Alumni and guests were counted in the Hungry Club audience of over 150 who attended the luncheon to hear Dr. Killian's discussion of "Quality Versus Quantity in College Education." Dr. Killian was introduced by R. G. Lafear '19, President of our Club. The talk was enthusiastically received by the entire audience, and Dr. Killian generously answered

a number of questions from the floor, as is the custom at the Hungry Club.

In the evening, Dr. Killian was introduced by George Hoffman '28, entertainment chairman. The audience, totaling 48 Alumni and guests, was the largest this year. Dr. Killian reviewed in detail the recent changes at the Institute and the plans for the future with respect to facilities, enrollment, sports, and changes in the curriculum. He was very gracious in answering questions after the formal discussion and left the entire audience with a feeling of pride in the Institute and confidence in its future ability to maintain the leadership which it has always enjoyed.

In addition to Dr. Killian's discussion, George Hoffman had arranged for the showing of a color film entitled "Pennsylvania," which dealt with the many historical and interesting spots throughout the state. It was made available to us through the courtesy of the Standard Oil Company of Pennsylvania.

Those attending the dinner meeting were as follows: W. C. Allen '33, C. T. Barker '27, E. M. Barnes '23, W. J. Bates '35, W. U. C. Baton '04, C. M. Boardman '25, W. K. Bodger '40, T. W. Bossert '20, J. G. Burke '38, E. L. Chappell '24, E. J. Cole, Jr., '44, C. N. Cresap '42, F. L. Current '37, W. M. Davidson '26, R. V. Davies '16, D. W. Dimock '28, L. B. Duff '14, P. V. Faragher '13, B. J. Fletcher '24, D. S. Fraser '28, Julian Gammon '45, F. L. Gemmer '24, Gerome Gordon '46, M. M. Greer '26, H. H. Hall '14, G. M. Hoffman '28, G. S. Hubbard '28, J. R. Killian, Jr., '26, R. G. Lafear '19, H. L. Lang '09, J. P. Larkin '26, G. A. Ley, Jr., '46, A. T. Mason '33, S. D. Miller '32, A. H. Orr, Jr., '32, R. N. Palmer '25, C. F. Peck, Jr., '41, A. K. Redday '34, W. H. Reed '27, Henry Rockwood '32, J. J. Snyder '44, E. A. Soars '21, Thomas Spooner '09, J. J. Strachan '13, J. L. Thistle '32.—WILLIAM J. BATES '35, Secretary, 141 Woodhaven Drive, Pittsburgh 16, Pa.

M.I.T. Club of the Kanawha Valley

A ladies night was held by the Club on Wednesday evening, February 25, at the Edgewood Country Club in Charleston, W.Va. A total of 19 members and 12 guests attended the dinner meeting. After the meal, President M. E. Hitchcock '37 presided at a brief business meeting. High on the agenda was the announcement that President Compton of M.I.T., would be the guest of the Club at a dinner meeting on June 1. Dr. Compton is to come here after his commencement address at West Virginia University. President Hitchcock announced that the Club would invite to the dinner members of the 11 technical professional societies in Charleston. An attendance of 250 is expected.

Our Past-President, Francis George Davidson '22, reporting for the executive committee, outlined proposed changes to the

constitution and moved that they be adopted. The motion was unanimously passed. The changes provide for one-year terms for the president and vice-president and add the most recent past-president and two members-at-large to the executive committee. The following officers were elected for the coming year: President, Joseph C. Jefferds, Jr., '40; Vice-President, Benjamin T. Woodruff '36; and members-at-large, George Bradshaw '40 and Richard P. Little '42.

After the business meeting, a representative of the Esso Standard Oil Company screened two sound motion pictures from their film library. One, "New England Calling", recalled many scenes familiar to the Tech men assembled and was especially enjoyable.

The Alumni attending were as follows: William Brewster '98, Victor N. Kruse '22, Francis G. Davidson '22, Ray M. Durrett '29, Richard Gorman, Jr., '33, Benjamin T. Woodruff '36, Melville E. Hitchcock '37, Paul R. des Jardins '38, George B. Bradshaw '40, William P. Dooley '40, Joseph C. Jefferds, Jr., '40, Malcolm MacG. Anderson '42, Daniel G. Hulett '42, Richard P. Little '42, Robert F. Riggs '46, William K. Graw, 2d, '47, Robert J. Musser '47, Charles C. Neas '47, Alexis Pastuhov '47.—DANIEL G. HULETT '42, Secretary, 1595½ Quarrier Street, Charleston 1, W.Va.

M.I.T. Club of Quebec

The Club opened its 1947-1948 season with a luncheon meeting on November 24 at the Queen's Hotel in Montreal. We were privileged in having as our guest speaker, one of our own members, Augustin Frigon '11, general manager of the Canadian Broadcasting Corporation, who gave an informal talk on "Radio Broadcasting in Canada." The speaker was introduced by Paul Kellogg '11, President of the Club, and thanked by Gabriel Rousseau '25.

Dr. Frigon received his general engineering education at the Ecole Polytechnique in Montreal. He took postgraduate courses in Electrical Engineering at M.I.T. in 1911, at the Ecole Supérieure d'Électricité de Paris in 1921, and, in 1922, at the Sorbonne of Paris, where he received his doctor's degree. Besides, Dr. Frigon is a companion of the Order of St. Michael and St. George, and president of the corporation of the Ecole Polytechnique of Montreal.

Members attending, who numbered 27, were as follows: Henri A. Audet '45, Raymond Boucher '34, Armand E. Bourbeau '27, Thomas L. Brock '38, Léonard Cartier (summer session, 1940), Harry S. Chandler '08, Aimé Cousineau '16, Ferdinand J. Friedman '08, Augustin Frigon '11, Henri Gaudefroy '34, W. S. Hart '00, Stewart J. Hungerford '33, Paul Kellogg '11, Théodore J. Lafrenière '12, René Laplante '30, Jacques R. Laurence '40, Donald E. MacNair '48, George K. Marshall '41, Huet Massue '15,

Marvin W. Maxwell '23, Humphreys Milliken '02, Jean M. Raymond '34, Edwin C. Richardson '07, Gabriel E. Rousseau '25, A. T. Eric Smith '21, Alexandre Vachon '13, and George E. White '29.—JACQUES R. LAURENCE '40, Secretary, 1430 St. Denis Street, Montreal 18, P.Q., Canada.

M.I.T. Club of New York

In spite of the severe winter which we in this neighborhood have been experiencing, we have managed to keep our scheduled meetings going along pretty well, with better than expected attendance.

At our monthly meeting on the 18th of February, Professor Norman J. Padelford (International Relations), gave us a most interesting outline of the position this country occupies, when it comes to defending ourselves against the potentials of the Atomic Age. Some one hundred or more Alumni, turned out to hear Professor Padelford, and I feel sure that each of us left the meeting feeling a bit more relieved over our future. I strongly recommend that anyone who has the opportunity to hear him take advantage of the opportunity. Bill Kennedy '21 was chairman of the meeting and introduced the speaker.

At a short business session just prior to the scheduled meeting, the new by-laws of the Club were ratified, and the old officers and governors re-elected to fill the same office under our new name, the M.I.T. Club of New York, until the annual meeting for election of new officers is held in May.

Your Secretary has been in touch with a good many M.I.T. men of late. Joe Kelley '18 and Robert J. Hull '23 are carrying on in a big way for the Cities Service Company, down at 70 Pine Street. Incidentally, young Dan Kelley '46, son of Joe, found himself a job with the McGraw-Hill Book Company, much to the delight of the old man, because of the temerity young Dan showed. Dale Spoor '22 has recently moved up in the recent reorganization at the Air Reduction Sales Company. As I understand it, Dale will try to co-ordinate the promotion work in all departments of the company—quite a job, when you figure the many different products they produce. Jack Zimmerman '23 was on hand for the recent meeting of the board of governors; and of course Willie the Muse '22, Judd Payne '22, Bill Latham '26, Andy Mooradian '34, and Sam Reynolds '22 are regular attendants at most of these gatherings. And then there's Uncle Gawge Dandrow '22, recent President of the Club, who never fails to contribute his time and thinking, not to mention a shekel or two, towards the advancement of the Club.

John Austin '36 has in preparation another News Edition of the Club, which should have reached you before you read this notice. We are again sending it to all Alumni in the district, regardless of whether they are signed up as club members or not. If you don't get yours and want one, drop me a note, and I'll send you one as long as they last.—WILLIAM W. QUARLES '24, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

M.I.T. Club of Philadelphia

Your Club has reached a record high of 300 in paid memberships. How does your meeting attendance compare with that of some other groups? One or two local professional organizations having social functions indicate that their meeting attendance runs about 20 per cent of the membership while your Club can boast of 30 per cent or more regularly. This is a good beginning. Let's improve on it.

If you haven't been out lately, make it a point to meet with us on the third Tuesday in May, the 18th. If you're one of the regulars, how about bringing along that Tech associate of yours whom we haven't seen for a long time? Remember the date, Tuesday, May 18.

For information about Technology Alumni in the vicinity of Philadelphia, call Boulevard 0287.—SAMUEL K. McCUALEY '41, Secretary, 288 Copley Road, Upper Darby, Pa. WILEY F. CORL, JR., '39, Assistant Secretary, Box 358, Bryn Mawr, Pa.

M.I.T. Club of Rochester

Award of the Club's freshman scholarship to Raymond M. Haak of Palmyra was announced by Dwight Vandevate '22, scholarship committee chairman, at the Club's annual Christmas luncheon on Monday, December 29. Raymond Haak was admitted to M.I.T. in September, and is now completing his first term. He is enrolled in the Chemistry Course. Present students at Technology were guests of the Rochester Alumni at the luncheon—held each year during the Christmas holidays to promote contacts between Alumni and students and to bring to the "old guard" word of newer developments at M.I.T. James A. Eyer, freshman, Jerry M. Howell, junior, and Homer D. Eckhardt, graduate student, presented student's-eye-views of the year. Avery A. Ashdown, Associate Professor of Organic Chemistry, was also able to be present and to make his annual report to the Club! Social events, athletics, student activities, and academic developments were all highlighted by the three students giving their survey of postwar college life. The freshmen class winning of Field Day, formation of the M.I.T. Soaring Club, the Tech's-A-Poppin week end, and many similar developments were described. None of the students thought that the Institute's academic requirements and the rigidity of its program had suffered in the postwar modifications.

Professor Ashdown '24 was introduced by our Club President, Kenneth J. MacKenzie '28, as the beardless associate of St. Nicholas indelibly connected with Christmas in the minds of the Rochester Club. Today's flood of students in all universities, Ashdown told the Club, is not a peculiar aftermath of the war but only the result of each year's normal increases in enrollment. Approximately two and a half million students are enrolled in institutions of higher learning this year, and there is no sign of any decrease in succeeding years. A survey of enrollment figures shows a steady yearly increase before the war, a sharp drop during the war years, and a postwar resump-

tion of increases along a curve that is very nearly an extrapolation of the pre-war trend. Even greater problems of crowding are foreseen about 1960, when these increases will be augmented by the multitude of "war babies" coming of college age! This year's enrollment at M.I.T. is 1,450 in the graduate school and 4,200 in the undergraduate school—comparing with pre-war figures of 500 and 3,000 respectively. Crowding at the Institute, Ashdown said, has not raised nearly as many problems as were anticipated. The educational program is going along very well, and many of the difficulties predicted during this hectic period have never developed. As a result, it is possible that postwar registration will not be cut back as far as was first thought. During the summer when summer school enrollment dropped to 3,500, Ashdown said, the Institute seemed by contrast to be deserted!

Features of the new building program were mentioned by Professor Ashdown. The Navy building for supersonic wind tunnel research and other Navy projects, beyond Westgate West, are well under way. March will see the start of the new library building, planned to be one of the outstanding engineering libraries in the Western Hemisphere; a completely new design has been adopted, and a large gift has been received for the incorporation of visual aids with other library facilities. The foundation has been prepared for the athletic cage to be erected west of the Armory and field house and constructed around the Navy's gift of a suitable roof. Ground has also been turned for the construction of the new senior house built in part of money contributed from the Alumni Fund. Not one stick of temporary buildings has been demolished, Ashdown reported; every bit of wartime construction is being used for research, instruction, or temporary housing. Most significant of the changes at the Institute, Ashdown said, is that the barriers of secrecy are gradually being lifted. The age of compulsory ignorance has passed with other wartime requirements!

Present Institute students from the Rochester area who attended the annual luncheon were: William F. Coombs, Jr. (graduate student, Economics and Engineering); Homer D. Eckhardt (graduate student, Aeronautical Engineering); James A. Eyer, (freshman, Business and Engineering Administration); William A. Farmer (sophomore, Economics and Engineering); Raymond H. Haak (freshman, Chemistry); William F. Halbleib (junior, General Engineering); Jerry M. Howell (junior, Business and Engineering Administration); Andrew T. Lemmens (junior, Mechanical Engineering); Richard F. Morse (junior, Mechanical Engineering); Donald W. Ramsey (junior, Mechanical Engineering); and Rolf I. Reizenstein (senior, Chemical Engineering).

The regional freshman scholarships awarded by the Club are given to men of outstanding ability in the entering class who will be benefited by scholarship aid. Recipients are chosen from the Rochester Club territory, roughly included within the triangle formed by Albion, Sodus, and Elmira, N.Y. Award of the scholarships was temporarily suspended during the war years when the

number of entering students dropped almost to the vanishing point, but their resumption with this year's award was announced by Chairman Vandevate '22. Members of the scholarship committee, in addition to Vandevate, are John F. Ancona '08, Harold E. Akerly '10, Leon L. McGrady '17, and Kenneth J. Mackenzie '28.

The following members attended the Christmas luncheon: Harold E. Akerly '10, Collin H. Alexander '39, John C. Artz '40, Warren A. Bishop '44, Christopher G. Bolland '45, Geoffrey Broughton '36, Howard F. Carver '32, C. King Crofton '22, Alfred vanC. Dasburg '36, Edward S. Farrow '20, Arthur S. Hamilton, Jr., '35, C. Watson Hamilton '39, Donald B. Kimball '20, Frederick J. Kolb, Jr., '38, Andrew Langdon '22, Harold H. Leary '23, James K. Littwitz '42, Emery M. Low '29, Leon L. McGrady '17, Kenneth J. Mackenzie '28, B. Darby Merrill '36, Victor J. Moyes '24, Ralph W. Peters '30, Earle E. Richardson '19, Paul H. Rutherford '21, Harold L. Smith, Jr., '39, Cyril J. Staud '24, Benjamin W. Steverman '31, Dwight Vandevate '22, William H. Vogt '19, Paul B. Wesson '98, and Clarence L. A. Wynd '27.—FREDERICK J. KOLB, JR., '38, Secretary, Building 14, Kodak Park, Rochester 4, N.Y.

M.I.T. Club of Central New York

Meeting for the first time since December 8, Alumni enjoyed another reunion on February 19, at Tubbert's Restaurant in Syracuse. After a preprandial round of good cheer, members and guests repaired to the dining room, where they were treated to some of Tubbert's famous cooking.

While the last cup of coffee was being downed, and while the cigar smoke grew denser, a few business items were discussed, namely, the matter of dues, the issuance of a membership list, and the high-speed railroading of new officers into the secretary-treasurer's and president's seats. Our Former President, Joe Owens, Jr., '40 through some fast double-talk and smooth chicanery, slipped out from the onerous duties that had been his for the past two years and managed to get the unanimous election of Jack Freiberger '45 for secretary-treasurer and Earle MacLeod '38 for president. Blushingly, the two new incumbents pledged themselves to bigger and better things for the Club.

The highlight of the meeting, however, was provided by Warren Walsh, chairman of Russian studies at Syracuse University, speaking on "The Bases of Soviet Policy." Professor Walsh pointed out how the Soviet's policy in world conferences is to disagree and to keep issues in a turmoil; how they believe that the "bourgeois" governments will eventually run afoul of great depressions and thereby show their inherent weakness; how they believe that then will be the time to step in and destroy the remaining elements of capitalistic society. But, in the opinion of our speaker, Communism is only a dream, and the way for us, as a nation, to prove to the world that we have a system that will work and will be the best for mankind is to have faith in it ourselves and do our utmost to maintain and improve upon the American way of life.

Professor Walsh also told of our efforts to inform the Russian people of our way of life by sending them monthly a United States Government publication and by broadcasting American programs to them. Although these efforts are puny in relation to the size of the job that has to be done, they are serving a good purpose and will undoubtedly enlarge in scope. That our speaker had an appreciative audience was attested by the fact that they listened attentively for about three-quarters of an hour and then fired questions at him for another three-quarters of an hour.

In addition to Professor Walsh and 22 M.I.T. Alumni, we were pleased to have with us Dr. Pennington of the Carrier Corporation. It was also a pleasure to welcome W. E. Hopton '91. Mr. Hopton helped organize this Club back in 1906, and was president of it for three and one-half years.

Other Tech men present were the following: H. W. Anderson '31, J. H. Copp '39, D. W. Diefendorf '30, G. R. Eddy '32, G. A. Fitzgerald '23, J. J. Freiberger '45, Natale Gada '26, L. S. Hayden '41, F. S. Hodgdon '42, J. H. Holton '17, F. S. Hungerford '24, D. L. Kidd '42, D. E. MacLeod '38, E. L. Moyer '44, J. F. Owens, Jr., '40, H. G. Reynolds '10, J. B. Sando '08, T. E. Simonton '24, L. A. Waters '20, E. L. Whitaker '31, and C. O. Wood '42.—D. EARLE MACLEOD '38, Secretary, 211 Columbia Avenue, Syracuse 7, N.Y.

M.I.T. Association of Japan

Our January meeting was held on the 13th in the American University Club room in the Marunouchi Building in Tokyo. B. V. Hettich '43 of the chemical industry branch of the industrial division of the Economic and Scientific Section, had kindly secured as speaker Fusano Isobe, a graduate of Indiana University in 1909. Ever since his return to Japan, Dr. Isobe has worked in the ammonia industry. He was connected with the Suzuki Shoten and later with the Toyo High Pressure Company. Having devoted most of his life to this product, he is credited with Japan's pre-war ability to supply enough ammonium sulphate fertilizer for her own needs. His alma mater has awarded him an honorary degree.

Dr. Isobe's talk on the history of the ammonia industry in Japan, the most interesting and worth-while lecture we have had since the war, lasted about an hour and a half, after which he answered various questions addressed to him. As usual, beer was served.

The attendance was as follows: C. Amano '28, R. Arisaka '17, Y. Hara '33, B. V. Hettich '43, T. Isobe '35, K. Kagami '22, M. Kametani '25, J. Kawai '21, T. Kasahara '24, Y. Kubota '23, T. Kuki '29, Y. Mikimoto '38, J. K. Minami '31, J. Okada '20, Y. Otsuki '37, George Yamashiro '42, and two guest students, O. Sugimoto ('28) and Y. Tanaka (summer session '07).—MASARU KAMETANI '25, Vice-president, 71 Shimizumachi, Suginamiku, Tokyo. GEORGE YAMASHIRO '42, Associate Secretary, Economic and Scientific Section, General Headquarters, Supreme Commander of Allied Powers, A.P.O. 500, San Francisco, Calif.

Washington Society of the M.I.T.

There may have been a calculated risk involved on Thursday, January 15, but to the Tech men present you simply couldn't lose. That thousand dollars we each acquired early in the evening helped us to feel flush for hours. The barkers were right. You couldn't lose.

You now understand our basic feeling at picturesque Old New Orleans Restaurant when the Washington Society wagered through its January smoker and dinner. No Tech meeting on record has seen so many wagers placed or "money" change hands so rapidly. Values were sensational—apparent from the moment we bought one thousand dollars for one buck.

After dinner Bob Thulman '22 named Bill MacMahon '22, Larry Conant '21, Jack Plugge '29, and Al Bird '30 as bookies. The horse race meet was for six races, eight horses in each race. We all put money on a horse from our fat roll of one thousand dollars. Bob then brought out his Course XV training in computing instantly parimutuel odds on all the horses. Lights out—movies—eight horses paraded, started, and raced. Yelling and cheering. Suspense—frenzy—and relief. The Differentiation Derby was over. Winners swamped bookies. One hundred and five thousand dollars was being redistributed fast. The Hyperbolic Handicap, Fourier Futurity, and others went into history until six races were run. Money was all too well concentrated in the hands of a few.

Bob Thulman did a lightning change at this point, turning into an auctioneer. He described a tableful of fine items ranging from a Telechron clock to shoestrings, which could be bought only with the "money" of the evening. He described how there was no way to lose. If the Club made too much from the auction, Bob had recommended the establishment of a scholarship at M.I.T.—a very specific sort of grant, the students to be eligible must be from Washington, be sons of the Class of '22 whose names begin with T. One helpful member did not think this exclusive enough, so a further stipulation was added. The name must also end with N. Bob was delighted at this coincidence, since his boy is now at M.I.T. P.S. There was no money available for this fund after details were concluded, even with track breakage considered.

Large winners made a lively auction. Small winners pooled their funds, thus freezing out the "grocery clerks" as Bob termed a small bidder. The clock went for \$6,200, the bourbon \$5,000, Scotch \$6,000, wallet \$2,500, and so on, until all the swag was gone. The value of the items equaled the "take" from sale of money earlier, so taken as a whole, we couldn't lose. What a night!

At the Y.W.C.A. on February 12, the Society was privileged to hear Sumner T. Pike, vice-chairman of the Atomic Energy Commission. Mr. Pike, an engaging speaker, brought the men listening to feel that they share his problems, as indeed we all do, being the public whom he serves. In the restless present, the A.E.C. copes with the task of steering a proper course guided by law passed by Congress in an era of naïve optimism, 1945-1946. Congress, assuming

an early meeting of the minds among nations, established A.E.C. along the familiar lines of a power commission or a commerce commission, not anticipating the suspicions and confusions of current events. Not as Congress thought would be the case, emphasis is now on weapons, stated Mr. Pike. We are making uranium (235) plutonium, and weapons of constantly increasing power as fast as we can. In fact, the time will come in a matter of months when the newest bomb will be Pacific tested.

Sumner Pike deplored that budget and scientists channeled into the weapon specialty starve other phases of Atomic Energy significant in peacetime. The very secrecy required because of emphasis on weapons withholds development of many industrially significant projects. Thus little can be done now about reciprocal information exchange with scientists and industry. The great question becomes: should you help industry if so doing would enable it to make a bomb? Mr. Pike stated that sitting between the horns of a dilemma would be comfortable for him since his position is balancing nicely upon five or six horns and not being able to get between any two. Once international agreements are concluded, the stuff made for weapons and stored can be reworked for peaceful purposes, and, conversely, atomic energy materials made by industry could in peacetime be reworked for war.

The A.E.C. has done more than produce weapons. The research completed has added to the fundamental and industrial knowledge of the country. Take the fluorides, for example. Little was known of this branch of chemistry until it proved essential to A.E. Now the tremendous increase in knowledge among scientists concerning the fluorides will be useful in many industrial directions.

The tools and laboratories required to study atomic energy cost sums of money far in excess of any possible expenditure by universities or industry. The government must establish these centers. Once made, the facility is geared for such staggering tasks that it is seldom used to capacity. Mr. Pike likened the facilities to a woman with two children to cook for, but having a cookstove big enough for a hotel. A.E.C. likes to have other outfits come to their "stove" to cook. The Chicago A.E.C. lab has an agreement with 29 universities for co-operative use of the facilities. Other regional labs have similar contracts.

Stating that electric power from atomic energy is at least 10 years away because of other cheaper fuels in America, Mr. Pike stressed the immediate importance of radioactive isotopes in many fields. He stressed in particular the value of isotopes in tracing the life processes in growing plants and animals. He compared the availability of isotopes with the Palomar telescope, which will increase the understanding of the astronomer twofold. Students of life processes have a whole new sphere of understanding thrown open to them by the use of isotopes. Specifically, we were told of radioactive calcium fed to a cow. Observers traced this calcium as it went from stomach, to blood, to organs, to bones, and to milk. Time cycles and divisions of mineral could be studied with

precision, not guesses as when using the old techniques. Plant foods in alfalfa and sugar cane can likewise be studied, using radioactive tracer isotopes. The A.E.C. is now in the business of selling isotopes. Mr. Pike produced a price list and read off scores of elements with isotopes for sale.

The horse race on January 15 drew an attendance of 55 Alumni; 66 attended the meeting of February 12. — JOHN A. PLUGGE '29, Secretary, 35 Oxford Street, Chevy Chase, Md. ALBERT F. BIRD '30, Review Secretary, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

CLASS NOTES

1886

The Class of '86 having recently lost its long-time Secretary, Arthur G. Robbins, by death, the undersigned has consented to carry on as acting secretary until a permanent secretary shall be chosen.

Letters were sent to 27 living members of both '86 M.I.T. and '86 S.M.A., supplied by Secretary Locke '96 of the M.I.T. Alumni Association, and replies have now been received from 19. Those replying are as follows: (M.I.T.) B. C. Batcheller, W. H. Buswell, H. E. Clifford, H. P. Coffin, J. C. Duff, R. G. Gamwell, B. M. Howe, W. R. Ingalls, W. F. Jordan, Fred Mackintosh, H. P. Merriam, H. G. Noble, and E. L. Pierce; (S.M.A.) H. P. Benson, W. K. Campbell, C. H. Herrick, B. M. Howe, and J. W. Killinger, all of whom seemed to favor allowing the Secretary's mantle to remain upon my shoulders as long as may be! My suggestion of a graduate member's being appointed as permanent secretary (because I had to leave the Class in the middle of the junior year on account of my eyes, I did not graduate) cut no ice with those who replied, so it looks as if I had jumped into a kettle of hot water without a life preserver and with no rescuer in sight!

Batcheller reports that he has completed his last six-year term as honorary secretary for the state of Vermont and signs from Wallingford, Conn. Benson writes from Salem, Mass., and signs as president of the Class of '86 S.M.A., and says that 12 out of a class of 47 are still living. Buswell, living in Methuen, Mass., tells of his leaving M.I.T. because of financial reverses in his family, and of his bookkeeping experiences and later connection with the Archibald Wheel Company of Lawrence, manufacturers of iron hub wheels for automobiles, of which concern he became president and assistant treasurer, retiring in 1925. At present, he is serving as treasurer of the Nevins Memorial Library and of the Walnut Grove Cemetery and finds care of the farm and these duties sufficient to occupy him pleasantly. Campbell of Wollaston calls me down for politely saying in my circular letter that, if the Class desired, I would do my "darndest" to act as a satisfactory secretary; he says that that is not a suitable word for an M.I.T. man; I should have said "damnedest," which is a masculine word! Coffin writes from Philadelphia that he retired in 1945 on account of deafness and now lives

with his eldest son in Philadelphia. He was a general accountant until his hearing became so bad that even a hearing apparatus did not help him; he says Clifford and Chase are the only ones left in his section that he can remember.

Duff reports that he is staying with his son, Dr. Paul Duff of Peabody, and sends me a copy of the lines he wrote for the 40th anniversary of the Class held at the Engineers Club in New York, apparently his permanent address. He tells at some length of his work in England and Germany and of his earning his Ph.D. in Berlin in 1902. In later years he served as chemist in the New York health and fire departments and more recently in the Electro Sun Company, Inc., of New York. Just now he is recovering from a serious illness under the care of his son Paul. Gamwell, whom we remember as our first '86 M.I.T. class president (perhaps the only one, as I do not remember any other), lives in Bellingham, Wash., and is greatly interested in botany and flower culture, and ships quantities of roses to dealers all over the states. The present Secretary called on him at his home several years ago when visiting his twin granddaughters in Seattle. He promises to send a more complete account of himself shortly. When reminded of his presidency of '86, he replied, "President! Ha, ha!" He sent a photograph of one of his botanizing camps on Mount Baker at an elevation of 4,300 feet, where he had to keep his automobile locked because of the bears.

Herrick is secretary of his Class of '86 S.M.A. and living in Boston. He reports that the Class has just issued a supplement to the earlier publication of the class history. He gives no information about himself or his recent doings but sends a copy of both the history and the supplement. Howe reports that he has retired from activities and is living in Los Angeles, Calif. He has two married children, a daughter and a son in the Navy; he lost his wife in 1945. Ingalls writes from New York that he is relinquishing his post as director of the American Bureau of Metal Statistics (1947) but is continuing in an advisory position. He states that he is in practice as a consulting engineer, especially in the zinc industry, with which he has long been associated; he expects to be at his home in Boxford, Mass., much of the time.

Jordan writes from White Plains, N.Y., that he retired in 1932, spent a few years "driving about the country," and now is without active duties outside of his home. He thinks "no one has a job for an old man!" He could have my job as secretary of '86 if he would take it — just a nice sweet job for "an old man," as I am finding out. Killinger reports that he is in San Francisco and still active in his profession as mining engineer; he still visits and reports on properties or takes charge of developments. To relieve my mind of any possible doubt as to his financial position, he writes that he is well known in the State Mining Bureau and has bank credit! The Secretary thinks the credits must be temporarily low as he has not sent on his dues! H. P. Merriam writes from Hubbardston, Mass., that he has been living there for the past 14 years or so but

has had no special business connection since he left his position as works manager of the American Welding Company at Carbondale, Pa. He promises more detail later. Mackintosh refers to his M.I.T. life at 27 St. James Avenue, Boston, where he boarded in company with my brother, Harvey S. Chase '83 M.I.T., and me in 1882-1883. The MacRaes of '85 were also there at that time. Most of his time has been spent in the electrical field; he worked at the Thompson Houston Works at Lynn and later with the General Electric Company, their successors. He was retired on a pension in 1929. He concludes his letter: "Many grads get good positions and go through life as good citizens but never do anything unusual to get public notice and so pass on quietly. That will be I—a busy life, many jobs well done, then a line or two in the daily newspaper. But I have had fun living my life." Noble writes from Westfield, Mass., and refers to the School of Mechanic Arts Secretary, C. H. Herrick, whose complete history of the S.M.A. Class of '86 has probably been received by all the S.M.A. members of our '86 joint alumni association.

Pierce (E. L.) of Princeton, N.J., writes but says nothing about himself other than that he and Clifford were the youngest of the '86 graduates, having entered at 16. We hope to hear more from him later. Ambrose Walker, now in Winter Park, Fla., reports that he retired from active architectural professional work in 1942 but does not state his present interests. This will be quite enough for this number of The Review. As the small boy said when asked by the priest if he had more to confess, "No, but I'll have a lot more tomorrow," so will I have another "stickful" a little later.—ARTHUR T. CHASE, Secretary, Island Creek, Mass.

1887

Henry J. Conant, II, a pioneer in the field of railroad electrification and a former Vice-president of Westinghouse, Church, Kerr and Company, the original Westinghouse Electric Corporation group, died in Clearwater, Fla., on February 14, at the age of 81. In his early days Conant sailed around the tip of Cape Horn in a clipper ship. He maintained his interest in sailing until a few years ago and was a familiar figure in yachting circles on Cape Cod. As an engineer, he was concerned with the building of the South Station in Boston. He is survived by four sons, John, Melvin, Lawrence, and Harold, and a sister, Miss Abbie B. Conant. He had not attended any of our class reunions for several years, and his only personal contact seemed to be with Oscar Nutter—and that not of recent years.

Clearwater is too far north in Florida to be really tropical. Your Secretary in Fort Myers finds it at 87 degrees quite often reported as the highest temperature in the United States at this season.—LONSDALE GREEN, Secretary, 5639 Kenwood Avenue, Chicago 37, Ill.

1889

William H. Dow died on January 31 in Portland, Maine. A Portland paper contained the following: "William H. Dow,

81, prominent real estate owner and grandson of Neal Dow, prohibition leader of a century ago, died . . . in his home, 9 Dow Street. Dow was part owner, business manager and treasurer of the Portland Evening Express and Sunday Telegram prior to its purchase by Guy P. Gannett. A Republican, he served in the Maine Legislature as a representative from 1931 to 1933. He was a member of the Portland Common Council from 1895 to 1898 and the Board of Aldermen from 1899 to 1900. In his last year as a member of the Common Council he served as president. He also was chairman of the Board of Aldermen. Dow was born in Portland, the son of Frederick N. and Julia D. Hammond Dow, and was graduated from Portland High School and . . . Technology. He was a member of the board of directors of the old Casco Mercantile Trust Company, and had served as president of the Portland Society of Natural History. He also had been prominent in Boy Scout work. He was a member of the Portland Club, Lincoln Club, Rotary Club, Portland Country Club, Maine Press Association, Maine Historical Society, Sons of the American Revolution, Sons of Colonial War, Loyal Legion, Odd Fellows, Maine Charitable Mechanics Association, Portland Society of Art, Round Table Club and the Settlers. He attended the Congress Square Universalist Church. Surviving are his widow, Mrs. Kate T. Wade Dow; a sister, Mrs. Marion Dow Eaton; two children, Neal Dow and Mrs. Stanwood L. Bailey; five grandchildren, William Dow Bailey, Marion Lee Bailey, Dana, Kendall, and Neal Dow, Jr., all of Portland."

Annie G. Rockfellow has changed her address to 220 East Los Olivos Street, Santa Barbara, Calif. Will Lewis is spending the winter at the family home at 216 East Concord Avenue, Orlando, Fla., where he writes he does quite a little "bowling on the green" and rests and loaf in the remainder of his time, but he complains bitterly of the cold weather. Who doesn't?—WALTER H. KILHAM, Secretary, 126 Newbury Street, Boston 16, Mass.

1891

The Alumni Association has notified us of the death of one of our co-eds, Anna M. Gove of Greensboro, N.C., on February 4. Dr. Gove has been director of the health department at North Carolina Woman's College for many years. She wrote us in 1936 as follows: "After a two-years special course in Biology at M.I.T., I went to New York to take training in medicine. After receiving my degree, I had a year of hospital work and then came south to a newly appointed school for white girls. Here I have had all the joys and trials of helping in its growth from a small institution of 225 girls to an A-1 college with more than 1,800 registrations."

A circular letter sent out by the Massachusetts Commandery, the Military Order of the Royal Legion of U.S., makes the following report on our classmate: "Companion C. H. Clark, who has served as our recorder since September, 1937, tendered his resignation of that office, on the advice of his physician, at the December meeting

of the board of officers. Although in his 82d year, Companion Clark hopes that with lessened responsibilities he may continue of service to the Order; and for many years to come the officers will look to him for advice and assistance with his valuable store of knowledge of Commandery affairs."

Harry Young has this to say about Clark and his own membership in the organization: "He was very much interested in this organization, and I happened to belong to it since my father died to keep it going. It is a relic of Civil War days. Officers of the Civil War were eligible for membership. It's a national outfit and Clark was recorder of the Massachusetts Commandery by virtue of being the descendant of an officer."

Bert Kimball wrote to me and to Ernest Tappan before Christmas. The following is from the letter to Tappan: "The last Review brought the sad news of the passing of Harry Bradlee. He was a very likeable man, and I think everyone felt that way. My daughter and her little son made us a visit of almost a year, and we had a very happy time. They are back again in Massachusetts, where I think she wants to bring up the little boy. My wife has been feeling not quite so well as I might wish, but she is fast improving under the doctor's care. I am feeling fine and hope you are, too."

Ed Smith is one of those who writes me once in a while because of his continued interest in our Class and in M.I.T. His factory is in Pawtucket, but he lives in Providence. I spend some of my days and he spends his nights in the same town, but we rarely meet, which is my misfortune. His February letter reads in part as follows: "An envelope addressed to you which has turned up among my papers, seems a hint to drop you a line just to emphasize that neither '91 nor its genial and efficient Secretary are forgotten. I read the class news in The Review with interest but am grieved to note our steadily thinning ranks. What a privilege to be numbered among its members—a realization that grows with the years. Of M.I.T., it is beyond me to 'paint the lily.' Tech speaks for itself not pretentiously, but confidently. Better, its accomplishments speak."

Of myself, there is little more than usual to write: I am still at my desk. We have an abundance of business (in orders) but are badly behind in the matter of procurement of materials. That truckmen's strike in Boston set us back. We have heard from time to time about debased currency. In my belief, we are suffering from debased sovereignty. Give my regards to '91."

A February letter from Walter Douglass tells of his life in the hills of Dunstable, and as usual he seems to enjoy it all, especially the "wild life." The following passage is taken from his letter: "It was a pleasure to receive your letter and to know that all is well with you except the transportation problems caused by our old time New England winter. Our problems here in the backwoods towns are not nearly so troublesome as are those in the cities. Fortunately, we have a big, powerful truck for the highway department with heavy ploughs, and they have done a fine job this winter. We have had daily entertainment for several

weeks with our flock of pheasants and crows and blue jays behind the house. There are eight pheasants every morning — sometimes nine — five crows, and 15 blue jays, and that is some color on the white background. We had three deer in our vegetable garden for three nights during the full moon in December. That was some sight on the snow! We fed them apples, and they came every night till the snow was too deep."

No news has come from Bowen or Walker in Winter Park, Fla. We ran across Will Wilder, who seems in good shape. We see or hear from Harry Young once in a while, and apparently both of us have had a busy winter, with very tiresome weather. We are planning for a class dinner in April or early May. Charles Clark has been at the Hotel Continental in Cambridge this winter. — HENRY A. FISKE, Secretary, Grinnell Company, 260 West Exchange Street, Providence, R.I.

1892

The Secretary again has the sad duty of reporting the death of one of our classmates, Gayle T. Forbush, who died at his home, 24 Grove Street, Natick, Mass., on January 29, after a long illness. Born in Natick on March 31, 1870, he was educated in the grade and high schools of that town and the Newton high school. Entering Technology with us in September, 1888, he was graduated in Course X. In his junior year he served as a member of the '92 Technique Board. Soon after graduation he entered the insurance business on the engineering side. His entire career was spent in that field as engineer, administrator, and executor until he retired from active business about 10 years ago. At the time of his retirement, he was United States manager and president of the Royal Exchange Assurance Group of fire and marine and casualty insurance companies with headquarters in New York.

Forbush had served as trustee of the Leonard Morss Hospital of Natick, trustee of the Insurance Library Association of Boston, and a director of the Provident Fire Insurance Company. While in New York, he was a member of the Technology Club and the Drug and Chemical Club of New York. He had also belonged to the Framingham Country Club and the Rotary Club of Natick. He was a member of the Natick Congregational Church. He is survived by his wife, the former Helen Grace Walcott of Natick; two children, Gayle W. Forbush (Harvard '22) and Mrs. Clarence I. Platt (Wellesley '22) of Milford, Conn.; and three grandchildren.

Since graduation Forbush had always kept up his interest in the Class of '92, attending a number of our class reunions. Last summer, however, he sent us his best wishes for a successful 55th reunion with regrets that his health would not permit him to be present at our gathering.

Arthur J. Ober and the Secretary were on hand to represent the Class at the mid-winter meeting of the Alumni Association at Walker Memorial on February 7. We listened to a very interesting program conducted by President Blanchard '17 as the presiding officer. Vice-president Lobdell '17 sketched the history of the Alumni Asso-

ciation from its beginning in the early seventies. President Compton reported on recent developments at M.I.T. and plans for the future. For the feature of the evening, George W. Gilman '23, director of transmission engineering in the Bell Telephone Laboratories, gave an exceedingly interesting and entertaining demonstration of the use of radar in modern telephony, making a number of long-distance calls which were relayed to the audience through loudspeakers. — CHARLES E. FULLER, Secretary, Box 144, Wellesley 81, Mass.

1893

Stephen A. Breed, who retired from the Faculty of M.I.T. in July, 1938, with the rank of associate professor emeritus, died at his home, 130 Brattle Street, Cambridge, on February 27.

Immediately after his graduation from Course II in 1894 and on until 1900, he was associated with his father's lumber firm in Lynn. Subsequently, he worked for the General Electric Company, returning to M.I.T. as an instructor in drawing and descriptive geometry in 1905. He was made an assistant professor in 1919 and was promoted to the rank of associate professor in 1928.

Early in his career Professor Breed was a member of the First Corps Cadets of the National Guard. His interest in the outdoors led him to travel extensively in this country and Canada. Being a recognized authority in woodcraft and mountain climbing, he was especially qualified to manage outdoor camps for boys and for many years was in charge of the Keewaydin Summer Camp at Lake Dunmore, Vermont. After his retirement from teaching he maintained his interest in boys' camps, serving as treasurer of Keewaydin Camps, Ltd., which operate several camps in Vermont and Canada. Canoe trips, including the thrills offered in the running of some white water rapids, provided his chief recreation. He was a member of the American Association of University Professors, the Appalachian Mountain Club, and the Woodcraft League of America.

Representing the Class of '93 and his associates on the teaching staff of the Institute, Herbert N. Dawes, Frederic H. Keyes, and Walter C. Eberhard '14 attended the funeral services held in the chapel of the First Church Unitarian in Harvard Square, Cambridge, on March 1. Surviving him are his wife, Laura Post Breed, whom he married in 1918, and a daughter, Margaret Post Breed. — FREDERIC H. KEYES, Secretary, Room 7-211, M.I.T., Cambridge 39, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston 16, Mass.

1896

Classmates should take pride in the report in the February issue of *The Review* to the effect that from the combined record of number of contributors and total contributed the Class of '96 is rated as being at the head, taking into consideration their record over the years that the Alumni Fund has been in being. Another pleasing announcement is that the extension of the aqueduct which is to run from Riverside to Chestnut Hill, bringing Quabbin water di-

rect to Boston, is to be given the name of the "Hultman Aqueduct" in honor of the late Eugene C. Hultman who headed the Metropolitan District Commission for several years. This tunnel will be driven through solid rock, and the Quabbin water will run directly into the Boston water system instead of going through the Chestnut Hill Reservoir.

Billy Anderson, with Mrs. Anderson, was in Boston during the first week of February, and the two Class Secretaries had the pleasure of lunching with Billy at the Copley Plaza on February 4. The main objective of their trip was to see their 16-months-old granddaughter in Sherborn. Billy is undoubtedly still the youngest looking man of the Class, which can probably be ascribed to his years of clean and regular living. At the midwinter meeting of the Boston Alumni held in Walker Memorial on Saturday evening, February 7, the presence of six classmates was noted, as follows: Damon, Driscoll, Crush, P. B. Howard, Locke, Rockwell, and Rundlet. Ralph Henry has unfortunately been the victim of an attack of pneumonia, but through the ministrations of Dr. Rockwell he is convalescing very nicely. Henry Sears now has moved to a new address in Wichita and in the future should be addressed at 308 South Clifton Avenue, Wichita 8, Kansas. This year there were no descendants of '96 men applying for the '96 class scholarship, and the award has therefore been made to Jan Buyser, a junior student in Course I who comes to M.I.T. from the Netherlands. Nathan C. Grover has received an award from the Washington Society of Engineers for outstanding professional services.

The big news of the month has to do with the annual gathering of the New York group, which was originally set for Monday, February 16, but was later changed to Tuesday, February 17. The arrangements, as in the past, were in the hands of Rear Admiral Bakenshus, and this year, by correcting the postal card announcement, Reuben got us to the President Tavern on Lexington at 41st Street, instead of to the President Cafeteria around the corner on East 41st Street. The Secretary was attending the annual convention of the American Institute of Mining and Metallurgical Engineers in New York. Rockwell made New York his first stopping place on one of his periodical business trips to Tennessee. He brought Fred Damon along with him from Boston. The 13 classmates attending were Bakenshus, Bates, Damon, Dorrance, Freedman, Gaylord Hall, Locke, Rockwell, Sager, Stevens, Stoughton, Tilley, and Trout. The two newcomers this year, Bates and Damon, were especially welcome. This annual affair is left in the hands of Bakenshus, Sager, and Tilley, and as always this year proved most enjoyable, with a fine dinner and good-fellowship. The Secretary had had the pleasure of sitting with Stoughton at the A.I.M.E. grand luncheon on the previous day. Ruckgaber and Starr had replied to Bakenshus that they would be unable to attend, and Walter Stearns had sent his reply from Raleigh, N.C., to the effect that he was in his new home there and the little item of distance from New York would prevent his attend-

ance. Doc and Dorothy Coolidge had gone from Schenectady on January 21 to Florida, and a note received by Bakenhus stated that the two of them had been leading a very lazy life at the Ocean View Hotel in Palm Beach reveling in the beautiful weather, which was very much out of phase with the weather they had left behind them in Schenectady. Jim Melluish in Albany reported that he was not in the best of health and did not feel it wise to undertake the trip to New York. Ed Sturtevant in Washington wrote that, although his work at the Shoreham Hotel was not so tremendously important, it did keep him tied down so that he was unable to get away to New York. Paul Litchfield was scheduled to be in Arizona the last half of February, which kept him away. Perhaps some classmates may not know that Paul is responsible for the Sunday broadcast on the ABC network at 6.30 P.M. Eastern Standard Time called "The Greatest Story Ever Told." The sponsors are really the Goodyear Tire and Rubber Company. The whole thing is anonymous. It is the only commercial program without plugs for the sponsor's product. It is the only religious program broadcast during the most desirable Sunday hours. It is the only program which does not give credit to cast, producers, or musicians, and it is the only program regularly portraying Christ in a speaking role. Bakenhus himself is now secretary of the American Institute of Consulting Engineers and he continues to lead the same active, energetic life. At our meeting he sported a long-stem pipe burning real tobacco.

Con Young has written two of his typically newsy letters, the last one being delivered at the New York meeting and extending his greetings. He had blossomed forth in new letterheads bearing the printed heading "Chatter from Connie." He reported that Florida this winter had been successive alternations of perspire-and-bake or shiver-and-sneeze. At times they had had the gas stove oven in the kitchen and the small gas grille stove in the living room fireplace going from early morning until late at night as well as a small electric glow grate plugged in the entire 24 hours.

The Secretary has also received a letter direct from Mrs. Lindenlaub, the widow of our classmate, Armin Lindenlaub. This letter repeated the dire straits under which she and her family were living in the Russian-occupied section of Germany. The Secretary has already given her appeal for food in a previous issue of class notes.

William B. Faville passed away on December 15 at his beautiful and picturesque home in Sausalito, Calif., overlooking Shelter Cove. This was a home he created on a spot he and his wife fell in love with during week-end outings to the hillside town. Faville was one of the noted architects of the country, first in New York City, but from 1898 on in San Francisco. He had been president of the American Institute of Architects from 1922 to 1924. He had designed the St. Francis Hotel in San Francisco and many other prominent buildings in California. During recent years he had been retired and had spent much of his time painting in a studio built on his estate

and working in his garden. He had become ill just before Thanksgiving and was believed to have strained his heart by over-exertion while gardening. Mrs. Faville had died in 1929, and there were no children.—CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge 38, Mass.

1897

Again it happens, to our keen regret, that the only news that we have to offer in this issue is to record the passing of another of our classmates. If you fellows of the Class wish to read pleasurable items in this column, why do you not send in letters of your activities and your experiences? If any of you are sojourning at a southern or a north country resort, write to us and tell us what a good time you are having. It will make us, who are still doing our daily stint on the job, envious no doubt, but it will make news, and that is our greatest need just at present.

Charles W. Frazier, VI, who was with us at the Institute for three years, died at his home in Pittsfield, Mass., on February 19. Leaving the Institute in 1896, he began work at the Lynn plant of the General Electric Company. In 1905, he was transferred to the Pittsfield plant of that company, retiring in 1941. He leaves a widow, two daughters, and two sons.—JOHN A. COLLINS, JR., Secretary, 20 Quincy Street, Lawrence, Mass.

1899

Lawrence Addicks, as many classmates will remember, was not content with one course at the Institute but received degrees in both Mechanical and Electrical Engineering. Since graduation, however, his interests have been largely in the mining and metallurgical field.

Lawrence was first employed with the Santa Rita Copper Mines in New Mexico but a year later became connected with the Raritan Copper Works at Perth Amboy as assistant to the superintendent. After five years in that position, he became chief engineer of the DeLamar Copper Works at Chrome, N.J., and a year later was superintendent of the United States Metals Refining Company in that same community. Eight years later, he gave up this post to become a consulting engineer for a number of metallurgical companies operating in the United States, Europe, India, and Burma.

Lawrence is a past president of the Electrochemical Society, a fellow of the American Institute of Electrical Engineers, and a member of four other mechanical or metallurgical organizations. During the last war, he was on the Naval Consulting Board. He is a member of the Mining Club and the Chemists Club of New York City.

Addicks has an office in New York but spends most of his time on his farm at Bel Air, Md. Clifford Balkam, who is located at Colorado Springs, has been in the stock brokerage business since 1905. He is a 32d degree Mason.

Soon after graduation, J. Walter Allen went to work for the Boston Elevated Railway and remained with that organization until his retirement in September, 1945.

For 30 years he held the post of electrical engineer. Walter is a member of the American Institute of Electrical Engineers, an honorary member of the New England Transit Club, and past president of the American Transit Association. In Masonic circles he has been past master of the council and past high priest of the chapter, a member of the Commandery and of the Mystic Shrine.—BURT R. RICKARDS, Secretary, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, Assistant Secretary, 53 State Street, Boston 9, Mass.

1900

At the Alumni Council meeting on January 26, Stanley Fitch, as chairman of a committee on resolutions, presented resolutions from which we quote: "Charles Burton Cotting died on November 17 . . . at his home in Watertown. He entered the Institute with the Class of 1900 and was active in freshman football and baseball. Although he left the Institute before graduation, he remained throughout his life a faithful member of the Class and a loyal alumnus of the Institute. In 1929, Burt Cotting was appointed class secretary, and in 1938 he became class representative on the Alumni Council and continued in both capacities until his death. In business he was associated for 35 years with the investment banking firm of White, Weld and Company in Boston. He leaves his wife, Mrs. I. Marion Cotting, a daughter, Loraine, of Watertown, and two sons, Duncan Cotting of Natick and Roger Cotting of Dover, N.H."

Harry Thayer, V, writes from Covina, Calif., as follows: "My first job out of Tech was in the cottonseed oil industry in Georgia. From that it was an easy and natural step into edible fats and soaps and kindred products. After managing plants in that line for approximately 20 years, I quit it to go into the business of organizing and directing financial campaigns for philanthropic work. This occupied me for another 20 years. About four years ago, I inherited a very comfortable home here in Covina and decided to retire to it and take things easier for the remainder of my allotted span. We find Covina, which is a small city 15 miles east of Pasadena, a delightful place in which to live and are enjoying it very much. Particularly are we glad we are not living in New York this winter, where we spent 23 years before coming out here. I find plenty to do in my retirement. A half-acre covered with flowers and fruit trees gives me plenty to keep me in trim physically, and church and various community activities keep me busy otherwise. The only drawback is that our children (three boys) and grandchildren (one boy and three girls) are all on the East Coast. That gives an excellent excuse, however, for going to the old home state of Massachusetts every summer, and it is hard to beat New England in the summertime. Incidentally, driving across the continent, as we have seven times now, has afforded us the very best way in which to get acquainted with this great country of ours. We have a log cabin on the shores of Long Pond in Lakeville, Mass. We head for that in June, stay there until late in September, and our

boys and their families spend their vacations with us there. George Leach and Sumner Manley are the only ones of the old crowd with whom I have kept in touch. I see George every summer, and we have visited Sumner in his home in Glendale, Ohio, and also at his summer place in Freedom, N.H. Last fall we had the pleasure of attending his marriage to Katherine Williams, the famous cornettist, which was a very happy event."

The Newton Graphic recently ran an article which is of interest to us: "Dr. Francis H. McCrudden, 19 Stoneleigh Road, West Newton, assistant medical director of the New England Mutual Life Insurance Company, retired December 31 under the Home Office retirement plan after a quarter-century of service. Dr. McCrudden was the originator of the blood-sugar tolerance test, which was devised in 1923, for selecting applicants for insurance with a record of glycosuria. This test, with details unchanged, is still used by the company. Few men have enjoyed a broader educational background than Dr. McCrudden. Following his graduation from M.I.T. in 1900, he put in four years of postgraduate work at Harvard before entering the Harvard Medical School from which he received his degree in 1908. Then came four more years of study in Germany, three of them at the University of Wurzburg and one at the University of Munich. He has been extremely active in educational and medical organizations as a teacher and consultant. He was director of laboratories at Robert B. Brigham Hospital for seven years and served as professor of applied therapeutics at Tufts Medical School. He joined New England Mutual's staff in 1923 and was appointed assistant medical director the next year. Dr. McCrudden held the rank of major in World War I. He has published two books and more than 100 papers on various scientific and medical subjects. He is a fellow of three associations and a member of numerous professional societies."

Ed Pitcher, II, writes on letterhead of the Keene Screen and Awning Company of Keene, N.H.: "I have in mind very vividly the Tech incidents that now seem to be almost ancient history. I am in my 72d year, still going and in almost perfect health. As to my history, I have not accomplished as much in the technical line as many 1900 men have, but the older I get, the more I appreciate the training that we fellows got at old Tech. Soon after 1900, I went to the Pacific Mills as an assistant in engineering, and got along for a while, but my health wasn't equal to the task, so I gave it up, together with a good salary, and finally, in 1908, bought out the business which I still own. This business just fitted, keeping my good health, and I decided that was worth far more than all the money in the world. I married in 1903. Mrs. Pitcher and I have two daughters: one married a lawyer and county attorney in Hudson, N.Y.; the other, a mill owner who has two mills here in Keene and one in Lowell. The daughter in New York has a small son and the one in Keene has a boy and a girl. My business was started in 1885 and still has quite a reputation through New Hampshire,

Vermont, and Massachusetts; we handle work on the best of buildings, hospitals, city buildings, and such."

The midwinter meeting of the Alumni Association at Walker Memorial on February 7 was attended by six of the Class — Brock, Jackson, Newhall, Richardson, Silverman, and the writer. The talks by Lobdell '17 and President Compton were very interesting; the demonstrations of the use of radio in telephony were fascinating and instructive. — ELBERT G. ALLEN, Secretary, 54 Bonad Road, West Newton 65, Mass.

1901

Ted Taft sent in the following news release which he received from the news service manager of the Commonwealth Edison Company, Chicago: "Will G. Kelley, assistant chief electrical engineer of the Commonwealth Edison Company, will retire on January 31 after more than 46 years of service with the system. Mr. Kelley began his association with Edison in 1901 as an inspector soon after he was graduated by . . . Technology. Before being appointed to his present position in 1943, he served as assistant engineer of distribution and plant design engineer.

Mr. Kelley has been active in the drafting of both state and national electric safety codes and in standardizing construction methods in the industry. He has been active, also, in the affairs of the American Standards Association, American Society for Testing Materials, International Electrotechnical Commission, and National Electric Light Association. He is a life member of the American Institute of Electrical Engineers. Mr. Kelley is a member of the Union League Club and the Sunset Ridge Country Club. He lives with his wife and three children at 730 Hibbard Road, Winnetka, Ill.

The New York Herald Tribune published the following dispatch from Amherst, Mass., dated January 27: "Professors William J. Newlin, Francis H. Fobes and Charles H. Toll, who have each spent at least forty years in the education field and whose years at Amherst College total 113, will retire in June and become professors emeriti, it was announced today by President Charles W. Cole. Professor Newlin is senior member of the Amherst faculty. He was appointed Walker instructor of mathematics in 1902, later taught both mathematics and philosophy, became professor of philosophy in 1909, a position he has held since. After working with the Young Men's Christian Association and the Educational Corps of the American Expeditionary Forces in World War I, Professor Newlin was director of the Extension Serbian Relief Committee in Serbia in 1919 and 1920. He has been secretary of the Amherst faculty since 1922."

Arthur Hayden writes as follows: "I have little news about myself to give. After my retirement from the Westchester County Park Commission in 1936, I kept busy (with intermittent periods of idleness) in private consulting work. In 1943 and 1944, I had a tough job to handle and worked myself near to a complete breakdown. After four months in a hospital, I decided it was time to let up and am now practically re-

tired. I kept up interest in living by engaging in committee work for the engineering societies. The enclosed reprints from Civil Engineering explain the inception of student guidance in the New York area, which is still growing strong. It meant a lot of work.

"Last October, Ripon College celebrated the inauguration of its Second Century Program, and I was invited to discuss the 'Relationship of Liberal Arts Colleges to the profession of engineering.' A condensed version of my discussion will soon appear in Civil Engineering. I found myself in distinguished company — leaders in government, business, industry, the professions, and in the fields of education and religion, from 13 states. Twenty colleges and universities were represented. As you may know, Ripon is one of 12 liberal arts colleges in the United States having co-operative agreements with M.I.T. Five years divided between the two institutions gives a student both A.B. and S.B. degrees. I was proud to receive a citation from Ripon 'in recognition of outstanding ability and distinguished accomplishment in the field of engineering' on the last day of the four-day program.

"I have been very poor about sending in notes about myself or other M.I.T. men hereabouts and I am probably known very little by my classmates. You may find some gleanings in the enclosed condensed composite of sketches in 'Who's Who.'

Space limitations do not permit us to give much detail from the condensed composite of sketches, which are taken mostly from "Who's Who in America," "Who's Who in Engineering" and "Biographical Directory of American Men of Science," but here are a few highlights therefrom: After graduation from M.I.T., Arthur Hayden was structural detailer for the American Bridge Company, structural engineer of the New York State Barge Canal, and then chief designing engineer for the Bronx Parkway Commission and Westchester County Park Commission. He developed the design and construction of the rigid frame bridge, a new engineering type for short and medium spans. More than 2,000 bridges of this type have been built. He has served as an officer of various technical societies, and has also been active in student guidance work in New York. — GUY C. PETERSON, Secretary, 788 Riverside Drive, New York 32, N.Y. THEODORE H. TAFT, Assistant Secretary, Room 3-282, M.I.T., Cambridge 39, Mass.

1902

Word has been received from the Alumni Office of the death, on January 13, of Jeremiah F. O'Neill, who took special courses with our Class. After leaving the Institute, O'Neill went into teaching, first at St. Paul's School in Concord, N.H., next, as sub-master at the Malden high school for five years; he then returned to the Institute, where he had charge of woodworking and foundry for some years. At the time of his death he was a resident of Framingham.

As a result of a request for news in the recent letter circulated about the 1952 reunion, several items of interest have been received. Saylor writes: "No startling news. For the last four years, I have been editing the official publications—Journal (monthly)

and Bulletin (bimonthly)—of the American Institute of Architects and having a grand time doing it. It really seems unfair to accept money for doing it. I started on the editorial path even before leaving Technology, by editing *The Tech*, then a weekly. Except for about 15 years of editing lay publications, such as *Country Life and House and Garden*, I've been editing professional journals in the architectural field ever since and have been at it longer than any one now living, I think. It's a great life! I have been in every state in the Union more than once, and pretty much all over Europe, meeting at least two generations of the most active architects in the profession. I've been working at odd moments for the last five years or so on a dictionary of architectural terms, which is nearing completion. I am making the illustrations for it now."

C. B. Allen writes that his bank, the People's Bank for Savings of New Rochelle, of which he is president, is building an addition which will increase its capacity three-fold. Pember, likewise, is having a very busy season.

Philip C. Pearson, whom we remember as the only member of the Class entering the ministry, gives the following news about himself: "I am Chenango County Missioner (since May 5, 1941), which means survey, maintenance, and promotion, intensively in one county; and since 1945, dean of the Third District Diocese of Central New York, which means three efforts in four counties; and very happy in worth-while undertakings under a son of Essex County as bishop, the Right Reverend Malcolm E. Peabody, D.D., S.T.D."

Those at the reunion in Osterville will be glad to learn that Vatter's daughter, who was taken sick at that time, is recovering after a long period of hospitalization. Vatter retired as of February 1, after more than 45 years of service. Bill Bassett was also retired on January 1 but is still engaged on special work for his old engineering and service firm, the New England Power Company.—BURTON G. PHILBRICK, Secretary; 246 Stuart Street, Boston 16, Mass.

1903

Only one member of the Class attended the midwinter meeting of Alumni on February 7—L. B. Gould, VI. Your Secretary was in South America, and the Assistant Secretary was also too far away from Boston to attend. We are sorry to have to record two deaths of members of the class: George M. Greene, V, died at his home in Ashland, Mass., on February 8, and Sam Graham Porter I, died in Calgary, Alberta, Canada, about the first of the year.

Greene had retired from Lever Brothers about four years ago and since then had managed his large apple orchard, one of the largest in central Massachusetts. Before entering the Institute he had served in the Spanish-American War. For 25 years he was with Lever Brothers as chemist and as general manager. He leaves his wife, Grace deHart Greene, two sons, one of whom was associated with him in the operation of his orchards, a daughter, and six grandchildren. George was a faithful and in-

terested attendant at all class affairs and from now on will be greatly missed by us all.

Porter, after being with the United States Reclamation Service, had moved to Canada in 1913 and became an expert on irrigation matters for the Dominion Government. In 1918, he joined the Canadian Pacific Railway as superintendent of operation and maintenance of the company's Lethbridge irrigation system. In 1925, he was appointed assistant manager of the Department of Natural Resources and, from 1927 until his retirement in 1942, was manager of the department. A pioneer in the development of Alberta's irrigation system, Porter was the first Alberta man to be elected president of the Engineering Institute of Canada.

This information came from Civil Engineering, via H. S. Morse. We are sorry to lose Porter from the Class. His son was in the East several years ago and brought his greetings to several of us in Boston. At that time he had just retired.—FREDERIC A. EUSTIS, Secretary, 131 State Street, Boston 9, Mass. JAMES A. CUSHMAN, Assistant Secretary, Box 103, South Wellfleet, Mass.

1907

Colonel James L. Walsh, whom you may remember as Jimmie Walsh, a lieutenant during our freshman year in the company of the Corps of Cadets of which Harold Wonson was captain, is now president of the Army Ordnance Association, stated on its letterhead to be "a membership society of American citizens dedicated to industrial preparedness for the national defense of the United States." It has about 40,000 members—scientists, engineers, industrialists. The Mills Building, Washington, D. C., is the address on the letterhead, but Jimmie can be reached at the University Club, 1 West 54th Street, New York City. During January, he sent me two very attractive folders, one being the program of the 29th annual meeting of the association held in New York last October 1, and the other, the program of this meeting on October 2 held at Aberdeen Proving Ground, Maryland. He also sent me a copy of the October 9th issue of *Business Machines*, the weekly publication of International Business Machines Corporation, in which is a full account of the Ordnance Association meetings, with some cuts showing our Jimmie to be a most distinguished-looking gentleman. These papers will be added to our archives for exhibit at our reunion planned for June, 1949.

Because it expresses so well the way that many people feel about the matter of preparedness, I quote from Jimmie's greetings to the Association: "I urge all our members—indeed all our fellow citizens—to continue with renewed ardor our quest for peace. In our past efforts to prevent war we have tried disarmament. We have tried treaties and international agreements. We have tried isolation. We have tried neutrality. We have tried moral suasion. We have tried threatening notes. We have tried stalling. We have tried appeasement and pacifism. None of them worked. The only method we have never tried is to adopt and carry out a sound and well-balanced program of preparedness. During World War II, American scientists, engineers, and

industrialists provided the machines and technology to save lives. They shortened the war and reduced battle-death expectancy by 80 per cent. Their continued interest in scientific and industrial preparedness may well avert war altogether and reduce our battle-death expectancy to zero. That is today's challenge. Ours is a peace society in the highest meaning of the term. Ours is the task to keep war away from our homeland. Ours is the job of national security now."

Through the courtesy of Charles R. Bragdon, who is manager of the special service department of the Interchemical Corporation research laboratories, at 432 West 45th Street, New York City, my name has been added to the mailing list of *Interchemical Review*, the quarterly publication of this organization. I have received two copies of this high-grade and interesting magazine. Our classmate is one of the three members of the editorial board.—Through the courtesy of Charles E. Locke, '96, I have learned that Laurence R. Davis is now quarry superintendent for Essential Industries, Inc., mining limestone for sugar refineries, his address being 120 17th Street, Paso Robles, Calif.—BRYANT NICHOLS, Secretary, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

We have already written that Jim Critchett, XIV, has retired from Union Carbide, that he and Mrs. Critchett have taken a semifarm down at Orleans on the Cape, and that they now plan to do those things they have always wanted to do. (See January number.) And who can blame them? In late January, when most of New England was digging canyons and tunnels in order to get through the snowdrifts, Jim wrote: "Up to last Sunday we have had only an occasional flurry which scarcely whitened the ground. That day we had our blizzard—three or four inches on the level, which drifted in spots to piles two feet deep. If you don't believe me, ask Len Loomis; he's down here, too. Next week Mrs. C. and I start for California via New Mexico and Arizona, driving overland by the southern route." How we envy them! In any event, we should get some good copy when Jim returns.

Our public-spirited and able classmate, Tom Desmond, keeps right on getting his name in the papers as he fosters some good cause. This time it is better motor traffic, and the article in the New York Times of January 25 is entitled, "Prediction for 1948: 30,000 Auto Deaths." If that is not a grim headline, I never saw one. Then Tom, in good technical fashion, tells of the causes of motor accidents and what can be done to reduce hazards on the highways. He goes into detail as to the causes of accidents and tells how they can be reduced. Cars are older and in poorer condition. Traffic is more dense. New York City has at the present moment 750,000 registered motor vehicles, and "Police Commissioner Wallender and his aides are bracing themselves against the day when the number will be

1,000,000!" Tom tells of the most common causes of trouble and winds up the article with this: "We have been talking long enough about how we are going to cut down the tragic, inexcusable traffic toll. Let's face the other question: Are we going to reduce this senseless killing or merely talk some more?" A rather devastating query, you'll admit, but in a good cause as is everything Tom tackles.

Both Tom, I, and Brad Dewey, X, enter the picture at Harvard. On February 13, the Graduate School of Engineering celebrated the centenary of the founding of the Lawrence Scientific School. There was open house with the laboratories operating full blast, scientific papers by faculty members, a tea served in the library, and a dinner in the evening at the Harvard Club at which Van Bush, '16, was one of the speakers. We were honored on the occasion by the presence of both Tom and Brad. Moreover, the next day, Saturday, the Visiting Committee convened for a meeting and a luncheon, and Tom as a member was there again.

An interchange of correspondence relating to the 1947 Alumni steins has taken place between Bev Dudley '35 and Paul. Bev writes to Paul as follows: "If by chance I should be down in New York this spring, I shall be certain to take you up on your invitation to quaff Heineken. Incidentally, these letters offered me an opportunity to have my first direct contact with Chet Dawes, and we have since met again through a course which the local section of the American Institute of Electrical Engineers is offering here in Cambridge. I am now taking this course, one night a week, in servomechanisms. For a textbook we use a volume on which I did some editorial work several years ago, when it was still in the manuscript stage. I can leave it to your own keen mind whether this makes me 100 per cent student or 100 per cent instructor in this particular case, or something in between."

We have already told how Paul Lord, III, and Betty are spending a part of each year in New York attending to the interests of the American Smelting and Refining Company. Here's an interesting story of the return trip to Texas, which parallels the experiences of many of us on the railroads during the past winter. "Dear Paul: It was kindly of you to take the time to write me your letter of January 25th. Both Betty and I were sorry that the weather prevented your having dinner with us in New York on the evening of the 24th, but all in all I think your decision was a wise one in view of the prediction of the weatherman, and recent past performances by the elements in New York. In any event we shall look forward to getting together with you sometime around the middle of the year. Our trip back to El Paso was not an easy one, but it is now over, and neither Betty nor I are any the worse for the experience. We left New York for Chicago on Sunday, the 25th, at 3:25 P.M. on the Pennsylvania Railroad. About an hour out of New York, a steam-pipe in one of the Pullmans up ahead of our car broke, so that we were without heat for several hours until they could take that car

out of the train and replace it with another one. Shortly after that, the generator in our Pullman ceased to function, and we went to bed by candlelight — a new experience when traveling by rail in this day and age. It all combined to make us some two hours late so that we lost our right-of-way and were sidetracked for trains going both east and west, including freight trains. A few hours out of Chicago the Pullman ahead of us developed a hotbox, and so we limped in from Gary at 15 miles an hour, arriving in Chicago some 8½ hours late on Monday afternoon.

"Early Monday morning, however, I had telegraphed the Rock Island Railway, advising them of my predicament, and fortunately they were able to secure reservations for us on the Golden State, leaving Chicago at 10:15 Monday night. We had originally planned to connect with a train leaving Chicago on Monday morning at eleven o'clock. The trip from Chicago to El Paso was uneventful except that we arrived in El Paso slightly over two hours late in the wee small hours of Wednesday morning in a small-sized blizzard, which was rather a paradox in El Paso, inasmuch as the slogan of the Chamber of Commerce is 'El Paso — where sunshine spends the winter.' On Thursday, the temperature dropped here in El Paso to six degrees below zero, which is the coldest on record, according to the weather bureau statistics. Incidentally, these statistics go back only to 1880. My friends accuse me of bringing some of the New York eastern climate back with me."

George Wallis, II, has sent us a clipping from the Chicago Tribune telling of the arrival in Manila, P.I., of Ed Ryerson, I, and Mrs. Ryerson on a Pan American Clipper. The occasion of the trip was a sad one, for they came to attend the rites of cremation for their son, Morton B., who at 22 was shot down by the Japanese over Leyte during General MacArthur's campaign. Welcoming the Ryersons at Nichols Field airport was Major General George F. Moore, in charge of the Philippines-Ryukyu command. He headed a delegation of Army officers. Officials of International Harvester also were present. "The peoples of the world have just passed through the most terrible ordeal, and it will not contribute to peace to talk about another war to come," said Ryerson. He deplored the destruction in Manila, but voiced confidence in the ability of the Filipinos to rebuild their capital and country. This is the first intimation that we have had of the Ryersons' having lost their son, and the Class extends to them its deepest sympathy.

We have only lately learned that Phil Chase, VI, has recently been elected a member of the executive committee of the electrical standards committee of the American Standards Association.

Shortly before we went to press, Paul received the following letter from Molly, which is self-explanatory: "As you know, I have been away from New York during January and early February, so I have no class news to report except with respect to my own activities. . . . Early in January, I flew to Athens, Greece, where I served for a month as consultant on public utility prop-

erties for the American Mission for Aid to Greece. I had an interesting experience in Athens and Salonika and flew back to New York early in February.

"The title of Mrs. Ethridge's book, *It's Greek to Me*, may well be applied to what I learned during my short stay in Greece of the inefficiency of the Greek ministries and bureaus, the overcentralization of the government in Athens, and of guerilla warfare and the border aggressions. I did learn some interesting things, however, about the electric, gas, and water systems that came under my observation. In the electric field these included the opportunity to see in operation a lot of obsolete generating equipment, the replacement of which had been made impossible by war and other disorders, including 25-cycle generators installed in 1905 and feeding into a 50-cycle distribution system through frequency changers; Diesel-driven direct-current units feeding an alternating current distribution system through motor generator sets; and Diesel-driven direct-current generators more than 40 years old feeding a 220/440 volt direct-current distribution system. I also found rates in effect which, at the dollar equivalent of drachmae, varied from three to 20 cents a kilowatt-hour for residential service, and from one to 14 cents a kilowatt-hour for industrial power. I was greatly interested, too, to learn of the many opportunities that exist in Greece for the economical development of hydroelectric power and returned with the hope that some way may be found under the European Recovery Plan to bring about the construction of at least three hydroelectric plants with a combined capacity of about 150,000 kilowatts.

"I also found some 75-year-old horizontal retort coal-gas plants in operation in Athens and Piraeus; and a water-supply system for the same region, which combined the Marathon dam and reservoir built by American engineers and contractors with Hadrian's aqueduct, still in use from Roman times; the supply is gravely threatened with partial or complete interruption as a result of seven years of continuous drought, culminating in the driest season of the period in the present year.

"I was greatly impressed with the opportunities for industrial development and economic stabilization in Greece through utilization of the available mineral and hydroelectric resources, and the hard-working, ingenious, mechanically-inclined working population, provided the difficult political and military problems can be successfully solved. I certainly hope that our efforts and those of the co-operating nations under the European Recovery Plan will make it possible to progress in this direction."

The Boston Herald reported the death on January 12 at the age of 60 of another classmate, Leo S. Stone, I, civil engineer of the Boston Transit Department. A native of Boston, he attended the English High School and was granted his degree in Civil Engineering from M.I.T. in 1909. After a period of employment with the state, he joined the city department where he remained for 35 years, during which time he gained the nickname "Judge," for his knowledge and understanding of the problems of

city transportation. He was associated with most of the subways and tunnels constructed here, taking part in the construction of the first subway and the first vehicular tunnel of the city. At the time of his death he was engaged in plans for the new vehicular tunnel to parallel the Sumner tunnel. He leaves his wife, a son, Major Laurence A. Stone '35, U.S.A., of Aberdeen, Md., and two daughters, Mrs. Virginia S. Korn of Dorchester, and Mrs. Muriel R. Levinson of Newton.—PAUL M. WISWALL, Secretary, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, Review Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass. Assistant Secretaries: MAURICE R. SCHARRFF, 385 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1910

It is most gratifying to see how the Class responds to an appeal for a good cause but most astonishing how little news suitable for the class notes comes in with the checks. A few exceptions, however, bring information from classmates who have not been heard from for a long time.

Allen Gould writes from Cleveland as follows: "Life in this booming city goes on busily and pleasantly. I still have several irons in the fire, but most of my time is spent on the sales engineering activities of my company—industrial sales mostly in steel, heat- and corrosion-resisting alloys, and the new investment type precision castings. There's no chance for life to get monotonous with all the new developments and applications, although sometimes, as now, a little monotony would be welcome. However, we are going to take a quick look at Florida in the latter part of March. Sailing and yacht racing here on Lake Erie continue to be my chief hobby—from April to November—for the last two years in International 21's, built locally, but designed by Maine Yankees—the Hodgdon Brothers of East Boothbay.

"There are very few 1910 men in this section, but once in a while I run into Jack Tuttle and B. Darrow in Akron. I have been quite active in the local M.I.T. club over the years, serving a term as president which ended a couple of years ago, so have kept fairly closely in touch with the Institute even though I have been quite delinquent as a classmate. My best to you and any of the gang."

Andrew Fabens writes from Florida: "I was in New England last week and was delighted to get back to Florida. I saw Pete Gaillard and Henry Davis, both of 1911, in Washington, and have David Gaillard '49, visiting us now for the midyear vacation. I'm looking forward to seeing you at least by 1950."

Howard Richardson writes from Maryland: "Somehow I have lost touch with Technology, but I shall never forget how much my courses there have meant to me, even though I barely got through two years. Since leaving the Institute, I have entered the government and have been there for 38 years (in one division of the Department of Agriculture—cotton) but not on the same phase of work. I have found the work intensely interesting and quite enjoyable. My

present work is to analyze the results of spinning tests of cotton, particularly to find out the relationships between fiber properties and manufacturing properties. Our results have been published from time to time in the various textile journals. I am joint author with R. W. Webb, who is a swell guy to work with. I have taken night courses and was graduated in economics from George Washington University in 1932."

Gordon Holbrook writes from New Jersey: "I retired from active participation in the shipbuilding business about a year ago; but I confess it is hard not to jump when the whistle blows every morning as I did for nearly 40 years. I am doing some lecturing in local colleges, with gardening in the summer and snow shoveling in the winter, particularly since Christmas."

Roy Abbee wrote just enough to be included: "Someday when I get time, I hope to stop in your office and have a chat with you. It is a long while since I have seen any of the fellows, and I'd like to talk with you."

Francis Silsbee writes from Washington, D.C.: "I don't seem to run into 1910 men very often but had a nice surprise a year or so ago. My wife had become very chummy with a Mrs. Whitney who had enlisted with her as a volunteer at a children's hospital, and arranged for the Whitney family to stay at our house while we were on a long vacation. When they arrived to take over, Colonel Whitney turned out to be J.T., the former lieutenant of the company in which I rose from the ranks to be a corporal at M.I.T. 'It's a small world, isn't it?'"

The following account is quoted from the New York Journal of Commerce: "Eugene S. Anderson, advertising manager of the Hartford Fire Insurance Co., has retired on doctor's orders after a year's illness. Mr. Anderson joined the Hartford Company as a member of the advertising department's staff on April 4, 1921. At that time the advertising activities of the Hartford Fire and Hartford Accident and Indemnity Co. were combined. Later he was placed in charge of local agency advertising activities of the Hartford Fire. In 1931, Mr. Anderson was appointed manager of the entire advertising department.

"Born in Minneapolis, Minn., Mr. Anderson lived for many years in Springfield, Mass. He attended . . . Technology. Previous to his association at Hartford he was publicity manager of the National Farm Power, a group of farm papers at Springfield, Mass. The now retired Hartford manager is the author of several books on photography, is a former photographic editor of *Field and Stream*, and for a number of years was editor of *Better Photos*." —HERBERT S. CLEVERDON, Secretary, 120 Tremont Street, Boston 8, Mass.

1911

There were 10 of us at the annual mid-winter meeting of the Alumni Association in Walker Memorial on February 7: Henry Dolliver, Bill Fortune, Fred Harrington, Charlie McManus, and Carl Richmond, I; George Cumings and Dennie, VI; Obie Clark, II; Morris Omansky, V; and Emmons Whitcomb, X. Hooray for the Civils!

We all enjoyed the evening immensely,

featuring as it did radio in modern telephony, plus excellent talks by President Compton and Lobbie '17.

Our eagle-eyed Class President, Don Stevens, II, learned from a New York Times financial column in early February of another signal honor which has come to an '11 man: "President Truman has awarded a Certificate of Merit to I. W. Wilson [XIV], for increasing the output of aluminum during World War II," it read. In acknowledging my congratulatory note, Bunnie's secretary stated that it would be called to his attention when he returns from a Caribbean trip about the middle of March — definitely a well-deserved vacation. Don also wrote in mid-February that he had had a most enjoyable luncheon with Bob Wood, VIII, after which he took Bob through the Okonite plant at Passaic. Bob is with the Button Corporation of America, at 49 Dickerson Street, Newark, N.J.

While visiting in Washington, D.C., in mid-winter, Jule Hartshorn (Stan's wife) "caught" an article in the Washington Post, in Mary Van Rensselaer's column, under the caption: "Lights Up a Party: Luis's Invention Pleases First Lady," featuring, of course, our own Luis de Florez, II, as follows: "Though inventor and wartime Rear Admiral Luis de Florez is profitably busy these days, evolving plastic bookbinding for Doubleday, Doran, he rushed to Washington especially for the Navy Ball. Whimsical Luis brought along a pocketful of his favorite invention — a tiny battery tipped with an electric light which turns on automatically and burns brightly when submerged in water. The batteries were used on trial balloon runs and on life preservers during the war, but light up with equal abandon when plunked in champagne or Scotch.

"During the party, Luis gave one to Navy Secretary Sullivan, who was seated next to Mrs. Truman. Surreptitiously Sullivan slipped it into the First Lady's water tumbler. As Mrs. Truman lifted her glass, the bulb blazed. Fascinated, she asked for more to 'take home to my husband.' So Luis, his supply exhausted, raced through the snow to a cache he keeps in the Naval Hospital and in 16 minutes flat brought back enough batteries to pleasure the President for a year!" That's our Luis (Monk to you).

Gordon Glazier's two daughters, Dorothy and Leslie, who are also nieces of General Kenney, I, were finalists in the ladies' figure-skating championships at the Boston Skating Club in early February, and Dorothy defeated her younger sister for the title. Miss Glazier, a 22-year-old registered nurse at the Children's Hospital in Boston, teamed with Leslie in the girls' pair skating, but had to be content with the runner-up position in this event.

Recognizing the importance of knowing how to drive an automobile, a teachers' course in driver education and driver training has been instituted at Northeastern University in Boston by the school and the Registry of Motor Vehicles. President Ell, XI, in announcing this in early February, said that Northeastern is the first university in New England to offer a course of this nature, adding that the "dual-control" car,

donated by C. Norman Fay, Boston agent for Plymouth-Chrysler, will be used in the laboratory field exercises, with each student being given instruction in the development of manipulated skills.

From the Northeastern "Fiftieth Anniversary Notes" we learn the following: "On Tuesday, December 30, 1947, 'Prexy' Ell, the spark plug behind things at Northeastern, received a post-Christmas gift of a real live doll from his daughter, Mrs. Judson Scott Strong of New York. Rumor has it that the grandfather, mother, and granddaughter (Susan) are doing well." Congratulations, Grandpa!

Obie Clark told me at the midwinter meeting at Walker that he sees Hal Hallett, III, from time to time now, and in answer to a letter, Hal wrote: "In 1941, I gave up the contracting business and became construction engineer for the First Naval District and had charge of work in the millions. Last December, I became assistant to the chief engineer of the Port of Boston Authority at Commonwealth Pier No. 5, Boston 20. I like it very much." Home address: 7 Concolor Avenue, Newton 58, Mass.

A. T. Cushing, I, writes from Kansas City, Mo., that he noticed the quotations from Don Stevens' letters in regard to government handouts. "Ever since the Works Progress Administration started that sort of thing years ago," he continues, "I have felt it was wrong and have written Don at some length expressing my views on the subject, which are right in line with his. I feel that government handouts relieve people of responsibility for their own livelihood which they themselves should take. I have noticed it in my boys (17 and 23 years of age) and try to make them see that if they expect to have money to buy the good things of life they must, by their efforts, produce at least an equivalent amount of wealth. If everyone in the country consumes more than he produces, we are headed for the rocks. I was glad to see Don's statement in print and could not let the opportunity pass to let him know that at least one other citizen agreed with him. There's no change in my job (United States Dept. of Agriculture, 715 Temple Building, Kansas City 6, Mo.) and nothing new to write concerning myself or family — no births, marriages, or deaths."

Don had written me just before receipt of A.T.'s letter that "in closing our file, Dr. Compton wrote in his last letter: 'You are a keen and persuasive analyst, and I appreciate very much your last letter of January 12 with its well-considered arguments and point of view. This correspondence has really helped to clarify my own thinking.'

We may all take a great deal of pride in the over-all figures printed in the February Review for the Alumni Fund in its career to date — for we are fourth among all classes, both in percentage quota of subscribers and in amount subscribed. To you, my faithful classmates, may I express my deepest appreciation as class agent for the fine showing you have made possible for the Class of 1911.

When these notes appear, Alumni Fund IX will have just begun, and I know you will all carry on in the true 1911 spirit. So do! — ORVILLE B. DENISON, Secretary,

Chamber of Commerce, Gardner, Mass.
JOHN A. HERLIHY, Assistant Secretary, 588
Riverside Avenue, Medford 55, Mass.

1912

F. L. Mowry, XI, writes that although he is probably remembered as tall and skinny, 35 years in the meat-packing business with Swift and Company in Chicago have brought him up into the 180-pound class. He was for four years at their St. Joseph, Mo., plant, and since 1916 has been in Chicago in their engineering and construction department. He reports his family, consisting of Mrs. Mowry and son Boardman, to be in the best of health.

Harold R. L. Fox, III, general manager of the Jamaica Government Railway, has recently been honored by his Majesty, King George VI. He now affixes C.B.E. after his name which, translated, means Commander of the Order of the British Empire. Fox has two sons, the elder of whom was graduated from McGill last year, and is now with the Cerro de Pasco Corporation in Peru. His younger son is in Appleby College, Oakville, Ontario. Fox also has two daughters, both married and living in England.

C. L. Gabriel, X, is with the Publicker Industries, Inc., at 1429 Walnut Street, Philadelphia 2. Gabe does not state how the grain-saving program is working out with him. Personally, we haven't yet noticed any shortage of liquor.

Fred J. Shepard, Jr., VI, writes as follows: "Reporting on myself — both my daughters were married last year and are living in New England, where we can see them frequently. I am now a proud grandfather, as my son married immediately upon leaving the service. He took a year at Babson Institute and is now learning the business here at the Lewis-Shepard Company. I have recently been elected president of the Electric Industrial Truck Association, which means quite a bit of traveling and a little more work. The family now having grown up and moved away, we have disposed of the house in West Newton and moved in town on Beacon Hill. The address is 31 Chestnut Street, and we hope anyone in Boston will telephone us."

L. M. White, X, and Mrs. White, while in New York recently, had dinner and spent a most pleasant evening with the C. B. Vaughans, II. Vaughan is acting as a contact man for the Class in New York City. He will be glad to hear from any member visiting there. He is with Sulzer Brothers, and his home address is 455 West 34th Street, New York 1.

Harold W. Danser, VI, writes the following interesting news about his new venture in ultrasonics: "I was glad to have a copy of the letter from Jim Cook in which he brought to your attention the article in Business Week, dated February 7, page 56, on the Ultrasonic Corporation. He is correct in stating that Harold W. Danser, Jr., whose picture appeared in the article, is the elder of my two sons. We think we have a very interesting (and I hope profitable) field in high-frequency and intensity sound waves. We are receiving inquiries from a great many of our largest corporations. Harold, Jr., and I financed our company

through our family and friends about two and one-half years ago and have made rapid progress since that time. I am enclosing a copy of an article which appeared in the Wall Street Journal of Monday, January 26th. I thought you might enjoy reading it. We appear to have a very strong patent position in this field." The article referred to gives a comprehensive account of the character, uses, and methods of production of these high-power, high-intensity sound waves that are invading industry. Plants have been, or are being, installed to dry soap and paper, dispel smoke, recover chemicals from fumes, precipitate carbon black, collect sulphuric acid fumes, and recover fine metal dusts. Other uses are in prospect, and both the Army and Navy are interested. The Journal says: "The company that has pioneered strong-arm sound machines is a young firm. Ultrasonic Corp. was organized a little over two years ago, to the tune of \$250,000 capital. It's now doing half a million dollars of business a year and officials say they hope to double this rate in six to nine months. Average age of Ultrasonic's employes is a bit over 30. The president is 31-years-old Harold W. Danser, Jr., who was formerly with the Submarine Signal Co. . . ." He says "Ultrasonic has little interest in gadgeteering or playing tricks with the powerful new waves. 'We can set fire to a handful of cotton with our apparatus, but a match costs much less,' he explains." Very best wishes to Danser and Son in this project and thanks to Jim Cook for bringing it to our attention.

In order to provide a flow of news for The Review, instead of the trickle now coming in, the help of a group of correspondents is being solicited, whose function will be to write to each member of the Class inviting him to send news of his activities directly to the Secretary or Assistant Secretary. However, don't wait until you get such a special invitation, but write anyway and DO IT NOW. — FREDERICK J. SHEPARD, JR., Secretary, 31 Chestnut Street, Boston, Mass. LESTER M. WHITE, Assistant Secretary, 4520 Lewiston Road, Niagara Falls, N.Y.

1913

The big news in this issue of The Review is, of course, about the forthcoming 35th class reunion. The time is the week end of June 11, 12, and 13. The Boston committee consists of 10 of our classmates and, headed by Bill Mattson, is working diligently to make this reunion the biggest and best ever. The place will be the New Ocean House in Swampscoot, Mass., one of the finest hotels on the North Shore. It is only a short distance from the city, easily accessible, and an ideal hotel for a reunion. Beautifully located, facing the Atlantic Ocean, with an excellent private beach, this well-known summer resort has everything. Friday, June 11, will be devoted to getting together, with a class luncheon and a class banquet on Friday evening, to which the ladies will be invited. Saturday, we shall attend the various functions of M.I.T. Alumni Day and the Alumni Banquet in Boston. Sunday will be devoted to outdoor sports — if you are still an outdoor sport — with golf, tennis, swimming,

or motor trips to some of the historical spots along the justly celebrated North Shore.

You have all been notified about the reunion and to date (February 17), 49 members of the Class of 1913 have signed up to be with us. Several of them are bringing their families. The most distant man to register is Harold Crawford, who hails from Walla Walla, Wash. Because of this interest so far in advance, it looks as though our attendance will equal or exceed that of our last big reunion 10 years ago. Anyone who feels he is too old to take part in all the reunion activities should come anyway, because there is a large, comfortable front porch on the New Ocean House with a most glorious view of the ocean. There you can sit and reminisce about your activities of the past 35 years.

Some have become so famous that they write that they cannot attend the reunion because of other important activities. Larry Hart, for example, is making the commencement address at Georgia Tech in Atlanta on that June week end. Ed Gere is building a new home at La Jolla, Calif., and writes that he is tied up. Prescott Kelly, down in Birmingham, Ala., will be detained in early June awaiting the arrival of his sixth grandchild. Bill Mattson tells me that later he will send you a list of all who are coming to the reunion and urges everyone to sign up well in advance. Your Secretary will be out of town for several weeks and suggests that from now on you send any questions about the reunion to William R. Mattson, 211 Congress Street, Boston 10.

Phil Capen, X, has a new job. After five years with various Federal agencies, he is now training at the Massachusetts General Hospital for hospital administration. He is presently in charge of all employees except doctors, nurses, and dietitians at Baker Memorial. Paul Cogan, II, reports the formation of the M.I.T. Club of the Lehigh Valley. Three of the group of 20 who started the Club and two of the first four officers elected were members of our Class. Sam Rogers, II, has retired from the insurance business to live at Siesta Key, Sarasota, Fla. Sam and Mrs. Rogers plan to drive through New England in August and September and will miss our party by two months. Wood Selfridge, II, with the Standard Oil Company of California, began on a new job last fall, which means so much hard work that he cannot possibly come East this summer. Lee Bowman, IV, is a full-time teacher at Franklin Tech, Boston.

Arthur Hirst, V, wrote the following: "Here is a note from a typical '13 slacker. Living in Pawtucket (Center of Culture and Bad Roads), I certainly should have called on you long ago, but am so busy hiking around the country that I have had few opportunities. Having spent some 30 years managing large textile plants, I finally got sick of it and went into the other side of it, selling textile chemicals instead of using them, and it has been much pleasanter. I cover all New England and travel to any part of the United States where I think I can pick up a customer. I seldom see any of the '13 bunch but recently did have the pleasure of running into Ed Hurst. I plan to run over to Fall River soon for a visit

with him. I used to see Frank Morton at the Lincoln Bleachery until he decided that the scenery was better in Hollywood. In my spare time I have written articles on various phases of the textile industry for the journal *Textile Industries*, formerly called *Cotton*. You may have seen the one on "The Manufacture of Narrow Fabrics" and a series on textile printing. I bear the title of consulting editor, but that is about as important as vice-president in most concerns. Beyond taking part in such activities, I am just trying to keep up with the cost of eating in Poor Little Rhode Island, a fitting name for the state that has the dubious claim to having the highest cost of living of any state in the Union, at least so far as food is concerned. Enclosed is my check to cover dues for 1948 and those on which I have slipped in the past. Any excess may go wherever you please to put it. I'll surely be at the reunion in June unless it conflicts with my annual sales meeting in Hoboken, which usually is called during that month."

Frances Stern, V, who studied with our Class in the year 1913, died in December. She was a member of the Class and a remarkable woman. Frank E. Wing, director of the Boston Dispensary, sent the following information: "Miss Frances Stern, 74, pioneer nutritionist and founder of the food clinic of the Boston Dispensary, died on Tuesday, December 23, at her home in Newton, Mass. Her death followed a heart attack, and although she had suffered for many years from a crippling illness, Miss Stern still carried on her professional work and was in her office on the Friday preceding her death.

"The daughter of Louis and Caroline Stern, refugees from German persecution in 1848, Miss Stern was born in Boston in the South End, where she was to spend her life in social work. Her first contact with this work was in 1895, when she was codirector and founder with Miss Isabel R. Hyams of the Louisa Alcott Club, dedicated to teaching nutrition and homemaking to children. She studied with private tutors, was graduated from the Garland Kindergarten Training School in 1897, was a special student at Technology in 1913, and was a special student in the London School of Economics in 1922. For three years, from 1912 to 1915, Miss Stern was industrial health inspector for the Massachusetts state board of labor and industries; and also early in her career, was instructive visiting housekeeper for the Boston Tuberculosis Association and the Boston Provident Association, and in her settlement house work she came in close contact with the acute problem which daily bread is to many families. Another experience which further influenced Miss Stern's humanitarian approach to her field was her work, from 1918 to 1921, as director of an American Red Cross clinic for children in Paris. So strong was her belief that food, beyond supplying the minimum nutrition to keep body and soul together, is a vital factor in the struggle for economic betterment, that she not only dedicated her life to it, but inspired many to carry throughout the world her ideal of service and devotion to the scientific principles of nutrition.

"On Miss Stern's 70th birthday, July 2, 1943, the food clinic at the Boston Dispensary, which she founded in 1918, was named the Frances Stern Food Clinic in her honor. On the same occasion, the Frances Stern Nutrition Fund for the Tufts College medical school was established by friends. The food clinic at the dispensary, a lasting memorial to Miss Stern's vision and unceasing effort, when established, was the only one of its kind. Today some 50 similar clinics have been set up throughout the world. In recent years as many as 1,500 patients have made 7,000 visits to the clinic in a single year. These patients have learned, as individuals, what they should eat in view of their medical condition, with a consideration of their racial and religious backgrounds, their economic situation, and the diagnosis by physicians in other clinics taken into full account in the sympathetic advice given to each and every one of them. In addition to the direct service given to dispensary patients, the clinic under Miss Stern's direction has served as a teaching and research center for the Tufts College medical school, Simmons College school of social work, Framingham Teachers College, and Regis College. Hundreds of young women have carried the knowledge and inspiration gained from their training in the clinic to the far-flung corners of the globe. Visitors, too, from distant cities and countries have come in continuous procession to observe the operation of the clinic at firsthand. The principles of nutrition, as successfully applied in the clinic, have also been spread through innumerable articles and several important books written by Miss Stern, herself, and in collaboration with others. Outstanding among the books are *Food for the Worker*, *How to Teach Nutrition to Children*, *Applied Dietetics*, and a visual aid book for diabetics entitled *Diabetic Care in Pictures*.

"As a tribute to Miss Stern and in recognition of all that she has meant to the Boston Dispensary as head of the food clinic for the past 30 years, there was a period of two minutes' silence throughout the dispensary, marking the beginning of the private services which were held for her on Friday morning, December 26, at the Temple Israel meeting house in Boston." — FREDERICK D. MURDOCK, Secretary, Murdock Webbing Company, Box 788, Pawtucket, R.I.

1914

On Saturday evening, February 7, six members of the Class joined several hundred other Greater Boston Alumni at Walker Memorial to enjoy the annual midwinter dinner and the demonstration of new radio-telephone techniques which followed. Those present were Atwood, Crocker, Fales, Hull, H. D. Swift, and your Secretary.

Another of our classmates has had his card removed from the class mailing list. Bertrand Hunt Hale died about February 9 at his home in Hudson, Mass., where he lived alone. He was found by police who entered to investigate. Hale prepared for the Institute at the Hudson high school and was graduated from the Institute in Chemical Engineering. After leaving Tech-

nology, he was employed in various chemical laboratories and plants, including the Goodyear Tire and Rubber Company and the Cambridge (Mass.) Rubber Company, but was unemployed at the time of his death. He is survived by one son, Captain Wendell B. Hale of Lima, Peru, employed by the Peruvian International Air Lines.

John Newbury, who for many years has been with the Eastman Gelatine Corporation at Peabody, Mass., has been made general manager of the company. John is also vice-president and a director of the company, which is a subsidiary of the Eastman Kodak Company.

A. E. Gerald Collins, our English classmate, has been awarded the rank of commander of the Order of the British Empire for his work as group captain of the Royal Air Force in the late war. It will be recalled that Alden Waitt also received this award for his war service. Alden made a trip during January to a number of the islands of the Caribbean and to the Panama Canal Zone.

H. S. Busby, who was formerly with the Navy in a civilian capacity at Dallas, Texas, is now located in New Orleans and is associated with the Southern Regional Research Laboratory of the Department of Agriculture. He reports that while he was looking for a house, he stayed temporarily with C. W. Ricker, professor of electrical engineering heading the department at Tulane.

How many remember the Alumni Dinner at the time of our 25th reunion when 1914 had front tables? Or better yet, remember Art Peaslee stepping up to the head table and engaging Dr. Compton in conversation as to where to send his son David to college? With such facts as Art was able to muster, Dr. Compton — perhaps with one eye on the '14 men in front of him — said to send him to Princeton, and if more training were wanted, to have him come to the Institute for graduate work. Art did just that, and at the February commencement David received his doctorate in physics from Technology. Have any other sons of classmates yet received a doctorate? Your Secretary would like to hear of them. On Christmas Day, Art announced the engagement of his daughter Marcia to David Frank, a reporter on the *Wall Street Journal*. This may enable Art to give some of the class financiers a little inside market information.

Frank Ahern has a son, Dick, at the Institute, who is a sophomore in Architecture. He dropped in to see your Secretary the other day, and on questioning him about his grades, your Secretary came to the conclusion that it is certainly lucky these sons do not have access to their fathers' grades. Dick was doing very well and is a fine-appearing young man. Another class son who is doing right well is Dick, son of George Perley.— H. B. RICHMOND, Secretary, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, Assistant Secretary, 1775 Broadway, New York 19, N.Y.

1915

A check for \$5,000, the largest 1915 has ever received and one of the largest the Fund has ever received, has skyrocketed us

over the top! This splendid and generous contribution has gloriously closed the biggest and best year 1915 has had in the Fund. Many thanks, many blessings to you all! Just continue that same fine spirit with your smaller checks for the current class dues. The responses so far have been wonderful — you're a great bunch of fellows and friends!

By now, some of you have had Gene Place's opening letter on our \$50,000 for '15 in '65 campaign. Gene has done a monumental job in preparing a most comprehensive plan that will make it easy giving for every classmate. He's going to need your help, and if he calls on you for a little committee assistance, be willing to give.

In an article in *Collier's* for January 31, on "How to Break a Political Machine" is a picture of Frank Scully sitting with the Cambridge (Mass.) Board of Directors, which has done such an admirable job in reforming that city's political problem. Frank, always civically generous and community-minded, took an energetic and active part in promoting Plan E in Cambridge, a dramatic struggle as told here.

From our most distant classmate in Shanghai, China, Pellian T. C. Mar, and Mrs. Mar, comes a greeting card wishing us "good health and happiness and a joyous spring festival." It's fascinating to hear from Pellian. His letters and the complicated airmail postages are always interesting. This one was written on Christmas Day: "Many thanks for your letter. Yes, the present airmail service is excellent; sometimes we are able to receive a reply from the States by air mail in seven or eight days. There is still, of course, much room for improvement. I note that you are very much interested in the postage stamps on the envelope of my previous letter. To explain the overprints on some of the stamps, I have to say that it is evident that the stamps of \$2.00 and \$20, Chinese National Currency, were printed sometime ago; later on as the postage increased with the currency inflation, the denominations of these stamps were too small to be of any value. In order to save waste, the postal authorities apparently adopted the overprint of higher value so that old stamps could be utilized. The inflation, if not checked, will accelerate, and the cost of postage is, of course, not excepted. Hoping this letter will find Mrs. Mack and your good self in the best of health and wishing you a very merry Christmas and prosperous New Year . . ."

We have just received notice of the deaths of Colonel Virginius E. Clark, 1067 Corsica Drive, Pacific Palisades South, Calif., on January 30; Brendon P. Lyons, New York City, last June; Alfred Wandke on February 14, 1941; and Nathan T. Ashkins, San Francisco, Calif. (no date given). Since none of these men was active in the Class, we have no details to report. We extend our sympathy to the families of these classmates.

You will be pleased to know that our old gym and track coach, Frank M. Kanaly, who has been out of athletic activities for some time, is now working for the General Alarm Corporation, 89 Broad Street, Boston 9. It would please Frank to hear from some of

you old track and gym stars who once profited by his inspiration.

Pay your class dues! But more — help, help! Notice the reduced size of our 1915 column. Send me some news about yourselves for these class notes. All the best!— AZEL W. MACK, Secretary, 40 St. Paul Street, Brookline 46, Mass.

1916

There has been a little lull in responses to letters from your Secretaries asking for current news for our notes. But now that the Christmas rush is over, we are expecting better returns. We recently had, however, a very welcome note from Charlie Glann, VI, who has spent a considerable number of years abroad. Here is what he says: "Up until the beginning of 1938, I was for 12 years works engineer for the Vacuum Oil Company, S.A.F., Rue de Courcelles, Paris, France, and then consulting engineer with John Chandler, American architect. I returned to this country at the beginning of 1938 after the death of my first wife, who was French. I served in the 77th Division in World War I, as first lieutenant, 302 Field Signal Battalion. During World War II, I was with the General Electric Company in their turbine department, and for the past two years I have been assistant building electrical engineer for the department of public works of New York State, in Albany. I am now happily married and find life in Albany very pleasing. The M.I.T. Club of Albany has a dinner about four or five times a year, and we keep in touch with events at M.I.T. through our Club." By the way, Charlie, won't you prepare for our columns an essay on the appealing subject "Impressions of Paris, through the Eyes of an M.I.T. Graduate"?

Your Assistant Secretary had an interesting letter from Lewis M. Dow, from whom we had heard little since the old days on Boylston Street. This comes from Florida at a time when many of us wish we had chosen the Sunny South instead of the snowy regions in the Northeast. Here is what Lewis has to say: "Long time no see' but I have been intending to write to you for the Lord knows how long. Your letter arrived Saturday, while I was busy putting in casement windows (29 in all) in our large screened porch here at home. Now for the brief biographical sketch. I am employed at the municipal gas plant office as technical clerk — estimating gas made and the daily send-out, checking recording instruments, the total cost per thousand cubic feet of gas, and so forth. The lady I married in 1916 decided in 1925 to go her own way; so I was given custody of the two girls and came South in November, 1925. Dad and Mother died in 1934. I married a Georgia girl in January, 1935, and we are getting along just great. I have three grandchildren, two boys and one girl; my daughter Edna is living here in the Pasadena section of the sunshine city, married to Harry Dietrich, a detective on the police force. My hobby is woodworking, and I can swing a wicked brushful of paint. I have a log cabin at a lake about 15 miles from here and go up there every chance I can get to cool off in the summertime. Well, I hope this hasty

sketch will not arrive too late for the '16 class notes and will help you fill them."

We have a letter from Bob Diemer which reads as follows: "Your three recent letters have been received. My hat is off to you for your persistency in wanting my postgraduate experience. I have hesitated to write about what I have done. That is why I ignored your other two letters. I thought you would just let it go at that. But I couldn't ignore your third appeal, so here goes." And there follows a nicely tabulated list of items which include the following: In World War I, Bob was a chief petty officer in United States Naval Aviation. He has held various positions including one in electrical maintenance, Midvale (steel) Company, Philadelphia; sales engineer, Leeds and Northrup Company, Philadelphia; airplane engineering, Curtiss Aeroplane Company, Buffalo; heavy machine, structural steel, and boiler design, Barber Asphalt Corporation, Buffalo; sales engineer, Sowers Manufacturing Company, Buffalo; and radio sales engineer and territory sales manager, Atwater Kent Manufacturing Company in Philadelphia. He now has a government position with the Post Office Department in Buffalo. He has been married for 18 years but has no children. His hobbies include experimenting with super HI-FI electronic phonographs and amplifiers, archery, piano playing, and — here is something unusual — growing gourds. Bob also indicates that he is keeping abreast of television developments.

Herb Gilkey from Iowa State College writes as follows: "Yes, I always browse through the class notes and tarry in detail over those of 1916. Doing so keeps me in touch, by name at least, with many of the fellows with whom I have been entirely out of contact for the last third of a century. I do not recall ever having made a personal contribution to this column. Since I always enjoy finding out what the other fellows are doing, it is just possible that a few words relative to my own prosaic existence may be of interest to somebody. Right now I am too busy fighting too many unmet deadlines even to start, but you may take this as an expression of an honest intention to come across with something at the first lull (if any). In the meantime, accept this note as commendation for the manner in which you and others of your secretarial predecessors or colleagues have in recent years kept the column going. I recall a long period during which 1916 class notes were conspicuously lacking." Herb signs as head of the department of theoretical and applied mechanics.

A letter from Bill Barrett of the Metropolitan Life Insurance Company says, "I probably enjoy reading class news as well as anybody else and therefore should make my own contribution to help along the good work that you are doing. During the past year, I have had an expansion in my activities here which takes in the publication division of the company, in addition to the policyholders' service bureau of the group division. Also, during the past year, I was made third vice-president, group insurance, and third vice-president in charge of the publication division. This is keeping me quite well occupied and has been most interesting. I will keep your letter on call-up

so as to be sure I am a more frequent contributor." That's a wonderful idea, Bill, we hope the rest of you will use it.

E. J. Barney writes: "I cannot neglect your request for personal news for 1916 class notes, because I have enjoyed so much reading the news of others. The only news that may be of interest to any of the class members who may remember me is that in May, 1943, I was transferred from Frigidaire in Dayton, to be production manager of one of General Motors' youngest divisions — the Detroit Diesel Engine Division, because of the large Navy and Army program in building Diesel engines for small landing craft, tanks, engine generating sets, and so forth. Since the war, we have made numerous adjustments in our organization because of reduced volume, but we have a very satisfactory business which appears to have considerable growth in sight. I get to the Detroit M.I.T. meetings frequently and enjoy finding some of my friends there. My son was graduated from M.I.T. in 1942 and is now a metallurgist for General Motors' Frigidaire Division, Dayton, Ohio."

Bill Farthing is brief, for once, via Western Union, "No news — have been hibernating — terrific winter. Sorry. Bill."

From Bill Liddell comes the following: "I really haven't any news to offer which will excite the interest of the readers of class notes. I know, however, that I am always glad to read bits of news sent in by the other class members, so I should be willing to do my stint. It is now three years since I returned to Washington from Atlanta, where I had spent the previous three years managing the activities of the Federal Power Commission in the southeastern region. My present work is with the Division of River Basin, a unit of the commission's Bureau of Power. Since returning, my duties have kept me pretty well tied down here in Washington, with occasional visits to our regional offices. The younger generation of my family is pretty well dispersed. My two sons are continuing their education after a lapse of the two or three years they were in the Army. Bill, the older of the two, is studying at Yale for a doctorate in history. He is married to a Smith College girl, the former Eleanor Pack of Albuquerque, N.M. They presented Mrs. Liddell and me with our first grandchild last April and did me the honor of naming him William Andrew, III. Charles, the younger son, is studying at the New York School of Social Work, a unit of Columbia. He will settle for a master's degree. Betsey, the youngest of my children, is a sophomore at Rockford College, Rockford, Ill., where she is having an opportunity to get acquainted with the people of the Middle West. I am not one who can boast a hobby, as so many of my classmates are able to do. This is my loss, I know. My principal outside interest and diversion is found in keeping abreast of the numerous art exhibits which come to Washington. We have several fine art galleries here, and they provide me with a never-ending source of pleasure."

The following message came by telephone from Rusty White: "I wish to thank those classmates and near classmates who so generously entertained my wife, Frances, and

me while out on our 29,000-mile business tour of the United States. The high spot of my recent life is the transition from engineering to publishing. My first book, the combined Gospels, has been sufficiently well received to have caused me already to print a second 10,000-unit, and I am now contemplating a third printing of 25,000. As a number of you know, I originally edited the four Gospels into one continuous theme purely for personal interest in order to better acquaint myself with the life and teachings of Jesus. It was only upon the advice of various members of the clergy met while I was engaged on the work that I came to publish it. I do not hesitate to recommend it to anyone regardless of their particular belief. It certainly gives one a much clearer and more vivid picture of Jesus than can be gleaned by reading the four Gospels separately. You may obtain it in any bookstore or write me direct for it at 497 Huntington Avenue, Boston 15, Mass. The price is \$3.00. I am now engaged in an intensive national mail-order campaign directed to libraries, ministers, and schools in which the Bible is taught. It may be of interest to hear that the Shreveport Times thought sufficiently well of Part I of the combined Gospels, entitled "The Birth and Youth of Jesus," to reprint it in its entirety on Christmas day on their editorial page in place of customary editorials. Such acceptance was way beyond my wildest dreams."

Ted Jewett writes: "I'm sorry you are so insistent on notes for The Review. [We're sorry it's necessary, Ted.] I have very little, if anything, to report. At the present time, I am vice-president of Spencer Kellogg and Sons, in charge of their production. I have been here for the past 10 years."

We had a very interesting telephone conversation with Steve Whitney telling us about "Whit's End," his unique ski and winter sports lodge, where he furnishes all services to parties of 10 to 22 except that they must do their own cooking — no dishes though! It's five miles outside of Meredith, N.H., and easy to get to. (Three hundred yards beyond the Amoco Station, take the right and go five miles; there's a sign on the left.) For anyone who's interested, his telephone number is Meredith, N.H., 59-2. He says it's too cold for fishing but he is sitting on his bait! There are 40 ski tows within an hour's ride.

Mr. and Mrs. Bernard W. Wright have announced the engagement of their daughter Muriel to Theron S. Curtis, Jr., son of Mr. and Mrs. Theron S. Curtis of Providence and Menauhant.

We received the following newsy letter from Chuck Loomis: "I moved from Memphis to St. Louis last summer after managing our plant in Memphis for 15 years. At the Bemis Brothers Bag Company, I have taken over the job of director of labor relations and personnel for 27 plants, which probably means considerable traveling, and perhaps an opportunity to see some of our classmates as I get around. So far, however, I have managed to be too busy on my trips to have much time to look up anyone. I did try to find Irving McDaniel in Los Angeles but without any success. [We are working on getting his address; he is in the

process of moving to a ranch.] Both of my boys are back in graduate school, the older one at M.I.T. trying for a Ph.D. in Physics, and the younger one at the Tuck School of Business Administration at Dartmouth. He will be graduated in June. Incidentally, I spent Christmas in Hanover and found myself regretting that I hadn't attended one of those small and beautiful New England colleges myself, before tackling Tech. Rusty White and his wife showed up here about two weeks after I arrived in St. Louis. Just how he succeeded in finding me when I had no telephone number listed and no one knew I was in town, I have never been quite sure (unless only because it was Rusty), but he called one Saturday night and later drove out to the house, where he and his wife sat in on a poker game that was in progress. In spite of the fact that he was engaged in putting a new Bible on the market, we found it unnecessary to teach either Rusty or Mrs. White anything about the game. He was quite enthusiastic about the prospects of the new Bible, and some two or three weeks later had an excellent center spread on the book review page of the local Sunday paper. Memphis was a town where Technology meetings were held at intervals of 10 to 15 years apart. I think I attended two in my 15 years there. I am glad to be back in a city where there is a Tech Club, except that I found myself the second 'oldest living graduate' at the one meeting I have so far attended. A. H. Clarke '15, who is one of our vice-presidents, was my only protection. I made up my mind not to go to any future meetings without him!"

That's the news this month, but we have a message for you, and we want every last one of you to listen and give your strict attention. You might as well sit down and answer our letters in the first place, because you will get letters until you do answer. If you don't answer Dodge, I will get after you, and if you don't answer me, Dodge will start bothering you. Herb, Bill Liddell, and I once had a German professor in high school who said, "If we d-don't g-get it one way, we g-get it another; b-but we g-get it," and we will! — RALPH A. FLETCHER, Secretary, Post-Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Assistant Secretary, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

1917

Ray Blanchard, President of the Alumni Association, and Harold E. Lobdell, known as Dipe before he reached his present dignity as executive vice-president of the Association, joined hands to form half the speaking program at the midwinter meeting in Walker Memorial on February 7. The party was, of course, a success for the 16 or 17 members of the Class present. Tubby Strout invited all the Proper Bostonians for a cocktail salute to the President and Executive Vice-president at the Continental in Cambridge before dinner. In spite of Charlie Gilliard's effort the bar was not too busy, and as usual there were several who slowly sipped cokes. They did not include I. B. Crosby, whose concentrated interest in geology and dam sites continues, nor Louis Wyman, who with Tom Ryan decided that

the party should begin properly at Locke-Ober's at 1:30 in the afternoon. Louis still lives in Watertown and still cans sardines, but he has been so busy that he seemed almost as much of a lost sheep returned to the fold as did Tom Ryan, formerly of Thompson-Starrett, with whom he directed spectacular construction jobs, and now a partner in the Gross-Ryan Corporation at 45 Newbury Street, Boston, distributors of Soundscriber for the New England territory. The Soundscriber, for those ignorant executives still using cylinders on their dictating machines, is the modern silent stenographer, for which Tom admits only one weakness — as with all other dictating machines, the mistakes cannot be blamed on the secretary. Al Lunn said he was giving special attention to the return of Cryovac, the Dewey and Almy method of packaging frozen foods in balloons.

Ted Bernard had a date at the old family homestead in Connecticut and unfortunately could not be on hand. Rudy Beaver sold Art Dickson blades for his next operation, and Sherry O'Brien of Chicago lent glamour to the affair. Also present were Clarence Cochrane and Ray Stevens, and at Walker they joined Ken Bell and Ken Childs, who could not get in early enough for any pre-prandial chat. Gilliard told the group that he was now chief engineer of the town of Andover, and as such he is, of course, the obvious candidate should the town manager plan sweep that far.

The Boston Herald reports on Sherman at the helm as follows: "The importance which the Navy attaches to its Mediterranean mission is indicated by the fact that one of its ablest top-ranking officers, Admiral Forrest P. Sherman of Melrose, Mass., left New York yesterday [January 22] to take over active command. A quiet-spoken, determined, ruddy-faced man in his early 50's, Admiral Sherman commanded the aircraft carrier Wasp during the last war until it was sunk during the winning battle which halted the southward march of the Japanese. . . . After the Wasp went down, Admiral Sherman became top planning officer for Admiral Chester W. Nimitz, and accompanied Nimitz to Washington when the latter became chief of naval operations."

Ed Doherty is with the Warren Soap Manufacturing Company, Inc., in Brighton, Mass., and engaged on the development of soap specialties. These include one for delicate silks and rayons that is having most favorable reception in the higher grade specialty stores and in similar outlets where dependable high quality is required.

An item in a Stoneham, Mass., paper mentions Stanley W. Hyde, a former resident there, and tells of his "building" an academy in Yarmouth, Maine: "He has been principal of North Yarmouth Academy since he turned to the teaching profession (1927). Mr. Hyde has guided the school's growth from an enrollment of 33 pupils to 130. . . . Among Hyde's greatest material accomplishments . . . was his success in obtaining a new school building for the 133-year-old school in 1930. It was a gift from the late Cyrus H. K. Curtis, Portland-born Philadelphia publisher, who became interested in the institution after Hyde wrote

him of the problems of trying to reach youngsters in the outlying island and coastal areas."

One night in January, Frank Peacock telephoned from the Copley Plaza. He was in Boston for an interview with one of the larger New England power companies and acting as a partner in his present firm of Peacock and McKean, hydroelectric consulting engineers of 222 West Adams Street, Chicago. With his partner he has an interest in a contracting company now carrying on projects in Miami, Los Angeles, Duluth, and New York. His present emphasis is with heavy operations in California. In Boston he had seen Lucius T. Hill incidentally to his business visit but had not time for social amenities other than his courteous telephone call to one of your harassed secretaries. Frank promised to return to Boston and to spend a little time with us; he has since kept his promise. In Denver he had seen Peso Moody and passed on the unconfirmed word that Peso has married again and is now associated with an oil company in Colorado.

Word has come in from the Commodore, William Aloysiis Sullivan, recently engaged in co-ordinating and modernizing the fire-fighting activities and practices of naval bases, and recognized on many counts — perhaps best by the public — for his responsibility as naval officer in charge of the raising of the Normandie. An elaborately illustrated, detailed description of this gigantic salvage has been published by the Navy, and Bill was good enough to send us a copy. We shall be glad to show it to anyone interested who cares to call for that purpose, although we have no doubt that an extra copy or two is available if some engineer or ship enthusiast in the Class has a yearning for it.

As we go to press the man in the faded blue uniform brought in a tear sheet from *Chemical Engineering* for January. And we find that W. I. McNeill, relieved of the onerous duties of president, now has time for authorship. "Good Old Depreciation" is a scholarly expert's discussion of the technical phases of depreciation policy determination for the chemical industry. — RAYMOND STEVENS, Secretary, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, Assistant Secretary, 15 Hillside Road, Wellesley Hills 82, Mass.

1918

This month there is a regular April shower of news. The first precipitation comes via Pete Sanger from the January 30th issue of *Printers' Ink*. It suggests that William C. Foster, Under Secretary of Commerce, may be appointed to head the European Recovery Program. Foster, a Long Island manufacturer who lives in Scarsdale, N.Y., made a fine reputation for himself in his work with the Smaller War Plants Corporation. His sound handling of the Commerce job also brought him distinction. If he lands the E.R.P. place, businessmen, especially small businessmen, will be pleased. The other person prominently mentioned for the place is Robert M. LaFollette, Jr., former senator from Wisconsin. If he should become available, and if President Truman

didn't object to naming a Republican, Mr. LaFollette would probably be asked to take on Mr. Foster as second in command. The E.R.P. director will probably get \$25,000 a year. We think it more important that he cut through the confusion and dam the folly of a cruel world.

The second sprinkle comes from Harry LeVine via Bill Wills, and ends in Florida sunshine, as you will see. Says Harry in his letter to Bill, "Mrs. LeVine and I enjoyed Florida immensely, even though the sun did us dirt on a number of days by keeping in hiding. We met many fine people and had lots of fun. Being in the air-conditioning business, I found a market for my capabilities in Miami. The newest hotels are being air-conditioned, and there was quite an urge to start a branch of my business in the not-too-sunny South so I could have an excuse for important business trips in the balmy zero season we are now experiencing in the not-too-comfy North. As you may know, my son Burt has come back from M.I.T. and is deep in the thrall of air conditioning—learning to outdo the older generation. He and wife are living with us until they find an apartment. Last year we had the greatest year in our history, and although business has tightened considerably, we look forward with confidence to the future. Mrs. LeVine and I hope to make the reunion this year, though it is obviously in our busiest season. We have at M.I.T. a nephew, Barry Bloom, who expects to be graduated from Course V in June. I hope we can take in both events."

Next comes news of an unnamed classmate from an unidentifiable aeronautical executive via Page 102 of the February issue of *Coronet*. The article is entitled "This Way to Success" and quotes one of some two hundred successful executives interviewed as saying that the most valuable single course he had taken at M.I.T. was called Human Relations. By a process best described as leakage, we have ascertained that the professor could only have been Alexander Magoun. To this leakage should be added the financial trickle which has come in for the organ fund: a check from Edward A. Mead, and one from S. H. Franklin. Please make checks payable to the 1918 Organ Fund, and remember that our need arises from the 20 per cent government tax, which did not exist before the war (no exceptions made for colleges), and the increased price of everything. We require \$2,975 and now have about \$2,200. Harry Camp, himself an organist and a builder of organs, and his committee, with the advice of Professor Ralph Hudson '07, consultant to electronic organ builders, have approved the instrument built by the Baldwin Piano Company. Incidentally, we have already saved the Institute \$50 in that the Baldwin people provided an instrument free for the February graduation exercises.

As for plans for our 30th reunion, which will combine sentiment with dignity, almost everybody wants the week end of June 12th. So be it. They also cast their votes for a location near Boston in order for us to be able to take in the Alumni Dinner on Saturday night. Arrangements are under way, and you will be informed of the details in the next shower of news.—GRETCHEN A.

PALMER, Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Al Richards wrote in a report of the mid-winter meeting of the Alumni Association held at Walker Memorial on February 7. Present among the '19 classmates were Paul W. Blye, Anthony Contieri, George McCrery, George Michelson, Mrs. Fred Olfene (Margaret Pierson), Al Richards, Jesse Stam, and Duffy Slotnick. Boston papers carried a story on the 5,000-mile telephone call which stated that the voice of Paul W. Blye made 12 round trips, a distance of 5,280 miles, on the microwave circuit between Boston and New York.

Fred Given writes as follows: "I was glad to get your cheery card and to know that you have survived the rigors of the snow and ice that have beset New York and Westchester. It is very pleasant indeed to think of a reunion and a nice game of golf on a warm June day while we are surrounded by ice and snow and hugging the fireplace."—L. A. Gillett informs us: "I sincerely hope to attend the 30-year class reunion next year and am looking forward to it. As to myself I was appointed chief engineer of the Virginian Railway last August. I don't know whether you have that information or not but there it is. Best wishes."—Jacob Lichten of 2109 Luray Avenue, Cincinnati 6, Ohio, dropped a line to say hello. Thomas S. Derr says: "For many years now I have been running the American Steam Automobile Company of West Newton (65), Mass., a small establishment making custom-built steam cars, parts, and related articles."

Mrs. Murray P. Horwood (Louise Peirce), 8 Craigie Street, Cambridge 38, Mass., dropped us a line to say that she had no special news, except that they were snow-bound at the moment.—Howard McClintic reports that he's still with Ferguson and Edmondson at 406 Keystone Building, Pittsburgh 22, Pa.—Jack Fleckenstein was in New York several weeks ago trying to pick up some crude oil for his refinery up in Michigan.

Ev Doten, 6176 Bluehill, Detroit, Mich., dropped a note to say: "I want to be sure I am on all mailings for the reunion in '49. Please change your records to address me as above. I believe Norwich should be given favorable consideration again, as they treated us well in '44. I've returned to the Chrysler Corporation—Parts Division operating staff."—Duke Herzog writes as follows: "There are still no changes of note, and I expect to remain here in Chicago. My son is at Harvard; one daughter is in her first year at Ripon College, Wis.; the other goes in the fall and is trying for Cornell or Coe. The other day I saw Geo Burt, who is now living in Flossmoor as a Celotex Corporation engineer."—The New York Academy of Sciences announced a publication of *Annals*, Volume 49, Article 2, Chromatography by a large list of authors including Leo Sheldovsky. Those who are interested may purchase a copy for \$2.75.

R. R. Litchiser dropped a line of greeting from 2356 Oxford Road, Columbus, Ohio.—R. S. Hunt says, "No news! No ideas!

Just a few more gray hairs. I find that I am spending much time wondering whether to buy a house in Florida or in Cape Cod in which to spend my de- (or re-) clining years."—Roger Hall says, "I'm sorry I've neglected so many duties, such as sending this note in favor of a winter vacation in Florida with sunshine, orange juice, and so forth. I have just returned to face the cruel winter and to look after my business affairs here—and this is among the first to get my attention—I guess I'm lucky to have anything left after a month of playing down there, where inflation is no novelty. We're still erecting substantial building structures hereabouts and keeping very busy at it. Ours are so well built. I'd like to try the A-bomb test on 'em sometime (when I'm in Florida)."—W. H. Bassett, Jr., is now commanding officer, Ordnance Department, Alabama Ordnance Works, Sylacauga, Ala.—Bob Hackett dropped a line to send his best.

Lou Grayson writes as follows: "I am glad to note that we are going to have a 30-year reunion. I presume that we shall have it in Sun Valley, Lake Louise, or some worthy spot other than Boston. There is little news about myself that would be of any possible interest to any one other than my wife or three-year-old pricette. She is the sweetest thing that ever lived and is of course the apple of my eye, and the drain of my finances. After four years of fighting the battle of the Pentagon and finding it a losing battle, I left the Army to its own resources when it failed to put stars on my shoulders. I have returned to my old work in the insurance business, and am getting fatter and lazier day by day."

Mrs. Donald W. Kitchin wrote a nice letter giving us news of the Kitchin family. Abstracts of her letter follow: "Charles is living here in Wellesley while he teaches at Northeastern University—Spanish and French literature. He likes it very much—got his M.A. at Harvard. Don, Jr., is at the Pittsfield plant of G.E. attached to the research lab as mechanical engineer; he loves it and also gets in a lot of skiing. Bob is with the George Scott Company of Charlotte, N.C., a firm of accountants, and is studying for exams. We hope they will come north but can't tell when. What a winter—I've had virus pneumonia since Christmas—still run a temperature of 99.6. Don't even mention snow to me—12-foot drifts in our front yard! Don is fine and is enjoying his work at Simplex in the new physics lab. Maybe by the time the 30-year reunion comes around, Don and Don, Jr., will have the recorder all done so that you can make some records of the gang. Perhaps we can have them out here for a picnic. We have two Army picnic benches and could manage somehow. Then I could see some of you. I'm always left at home to ask questions and write letters—darn it! I want to be in on this one. I bet some of the other wives would like it, too."—EUGENE R. SMOLEY, Secretary, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y. ALAN G. RICHARDS, Assistant Secretary, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

It is with sorrow that I report the death of Dean Willey on January 23. Dean was vice-president of the New York, New Haven and Hartford Railroad and lived in Hamden, Conn. He was in charge of operation, maintenance, and engineering for the New Haven. His wife, Constance Moore Willey, survives.

A little more information about Bunk Talcott is contained in a New York Times story. He was secretary of the Torrington Company and sales manager of its bearings division. Before his connection with them he was stationed in Calcutta as representative of the Bemis Bag Company. He left his wife, Ruth Herrick Talcott, a son Jay, and a daughter Ann. He was chairman of the executive board of the Charlotte Hungerford Hospital, where he spent his long illness.

George Corr is with Wescott and Mapes, New Haven. Arthur Morley is in Hendersonville, N.C., having left Oak Ridge. Harold Peebles has left Sioux City and is with the Iowa department of agriculture at Des Moines. Bob Rowe is out of the Navy and lives in Chicago at 2860 East 76th Street. Warren Russell is with the James Russell Boiler Works in Dorchester, Mass. Ralph Spencer is with the Missouri state highway commission at Sikeston, Mo. Bob Vroom is now in West Hartford, Conn.

It is pleasant to have a number of '20 men on the Alumni Council and to see them at the monthly meetings. Those frequently present include Al Burke, Jim Gibson, Bat Thresher, Perc Bugbee, and Ed Ryer. It is pleasant also to report the election of Bob Patterson as a vice-president of the John Hancock Mutual Life Insurance Company. Bob was formerly manager of the Bond Department.

No news as yet from class grandparents or class fathers of M.I.T. sons. How about it, aren't any of you fellows proud of your achievements? — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

1921

This month ushers in a new fiscal year for the Alumni Fund, the eighth of the series. Mail your card to the Institute now to maintain Lark's excellent record. As these notes were being prepared, our worthy Class Agent was sweating under the strain of having reached 90 per cent of our quota of contributors and 97 per cent of our dollar quota for the seventh Fund year. In his terse advertising style, he tossed out frantic appeals which read: "WANTED — 27 members of the Class to invest only \$5.2527 each in the Alumni Fund. Can guarantee exceptional returns — 100 per cent of quota in both brackets. Larcom Randall, Class Agent." Please don't subject Lark to another photo finish this year. Make your returns early to keep him happy and eliminate those plaintive letters all stained with blood, sweat, and tears.

Reporter William J. Sherry of Tulsa, Okla., turned in the first Secretarial Committee report this month — and what a report: "To put Bob Miller a little further

back in second place for the largest family in the Class, I have to report that Richard Joseph, the second boy and the eighth youngster, arrived on last August 9. Billy, who is now 10, is still undecided whether he will have Dick follow in his footsteps as a quarterback at Notre Dame or as a member of the Class of '59 at the Institute. The activities of some of these offspring will make interesting reading when our Class is looked upon with the same feeling that we have when thumbing through earlier pages of The Review. Trying to locate and produce oil has kept all of us so busy during the past years that very few of us have taken time to do much traveling outside that connected with our work, and I have not seen any of the Class since our 25th reunion."

A note from our Alumni Secretary, Charlie Locke '96, announces that Ernest R. Gorden has taken the post of general manager of the Compagnia Minera Unificada del Cerro de Potosí. Ernie, who was formerly with the American Smelting and Refining Company in El Paso, Texas, can be reached by addressing mail to Casillas 30 and 52, Potosí, Bolivia. Axel G. H. Andersen is now with the Monsanto Chemical Company in the Clinton Laboratories at Oak Ridge, Tenn. Ed Farrand reports from Chicago that Harry Junod has been transferred from the Windy City to the Cleveland office of Pickands, Mather and Company.

Dr. Manuel S. Vallarta, former Professor of Physics at the Institute, cosmic ray and atomic energy authority, and now a professor at the University of Mexico, Mexico City, is the author of an article in the November issue of *Revista Mexicana de Electricidad* on the contemporary development of mathematical and physical sciences in Mexico. Val has been active in the conferences of the United Nations Education, Science and Culture Organization which were held in Mexico.

We are indebted to Daniel G. Hulett '42, Secretary-Treasurer of the M.I.T. Club of the Kanawha Valley, Charleston, W.Va., for his kindness in advising us about Tom Bartram. Says Dan: "Thomas W. Bartram is a research chemist with the rubber service division of the Monsanto Chemical Company at Nitro, W.Va. His children are making their marks in academic circles this year. Nancy is finishing her last year at Wellesley, where she is now the head of student government. Tom, Jr., has just been graduated from Bucknell at a midwinter commencement."

Dugald C. Jackson, Jr., consulting engineer, has been appointed chairman of the Cambridge Red Cross 1948 fund campaign, in which he will direct the activities of some 2,000 volunteer workers. A veteran of both world wars, Dugie has had ample administrative experience to qualify for a project of this size. For four years from 1941, he was executive officer in charge of planning and production at the Frankford Arsenal, Philadelphia, as a major in Army Ordnance. He was transferred to the Industrial College of the Armed Forces in Washington, before his discharge as a colonel in 1946. Before the war, he had been dean of the college of

engineering at Notre Dame, head of the electrical engineering department at the University of Kansas, and head of the department of mechanical and electrical engineering at the University of Louisville.

Philip T. Coffin was elected a member of the board of education of Glen Ridge, N.J., where he makes his home. Herman Kierer is a director and chairman of the executive committee of the Norwegian-American Chamber of Commerce, Inc. He is associated with the firm of Fearnley and Eger of New York City. Wesson Hawes '17 reports that Munnie and Alix Hawes celebrated their 25th wedding anniversary with a motor trip to New Orleans. Munnie is a member of the firm of Hawes and McAfee, realtors, of Manasquan, N.J.

Raymond L. Presbrey has been elected vice-president in charge of engineering, manufacturing, and construction of the Boston Consolidated Gas Company. He has been associated with the company since our graduation and was appointed an assistant vice-president in 1946.

From Washington, D.C., Secretarial Committeeman Larry Conant writes: "I attended the excellent smoker held in January by the Washington Society of the M.I.T. but was the only member of the Class present. We all had a grand time spending thousands of dollars in the horse racing which was staged for entertainment."

Appropriately, Ace Rood has been made the representative on the Alumni Council of the Indiana Association of the M.I.T. Elliot G. Peabody is president of this alumni club which meets in Indianapolis. Lark Randall similarly represents the Technology Association of Minnesota, of which Winter Dean is president. Lark is also a member of the executive committee of the Council.

Chick Kurth, Cambridge reporter and class representative on the Alumni Council, is the most recent grandfather of record. Linda Lee Wiechman was born in February to his older daughter, Barbara. A member of the special committee for the occasion, Chick has sent us a program of the mid-winter meeting of the Alumni Association, autographed by the following members of the Class who were present: Elly Adams, Chick Dube, Norm Ferguson, Algot Johnson, Joe Kaufman, Chick Kurth, Ed MacDonald, Andy MacLachlan, John Mattson, Chief Myers, Phil Nelles, Lark Randall, Herb Reinhard, Steve Seamos, George Schnitzler, Charlie Thornton and his son, Thomas Thornton '51.

Phil Nelles is still with the Malden Gas Company and Johnny Mattson with the Suffolk County Land Court. George Schnitzler reported that his work at the Bureau of Standards in Washington is now concentrated on fluorescent lamps. Charlie Thornton has charge of a number of electrical engineering projects for Stone and Webster. Joe Kaufman operates a very successful electrical appliance store on Province Street, Boston, where he has made an extensive television installation. Others at recent Council meetings were Warrie Norton and Jack Rule.

Chick also reports meeting Gustav Dahl at the office of Jackson and Moreland, where Gus is in responsible charge of major activi-

ties, following his return from war duties as head of the entire Norwegian government naval program to equip their ships with ordnance matériel, to train personnel, and to conduct overseas operations.

A review of Professor Carlton Tucker's annual staff directory masterpiece reveals that three of the Class are on the Institute Faculty: John T. Rule, Professor of Graphics and head of the section; Victor O. Homerberg, Professor of Metallurgy, and Walter M. Fife, Associate Professor of Civil Engineering.

James S. Parsons has left New York and is now associated with the underwriting activities of the First California Company in San Francisco. S. Paul Johnston, author, aviation authority, holder of the Legion of Merit and former captain in the Navy, is in the news as a member of President Truman's Air Policy Commission. Business Week for January 24 carried a picture of the commission in consultation with the President at the time of the report urging a heavy government outlay for a bigger and better air force.

George Chutter telephoned to say he had spent an evening with Rufe and Mrs. Shaw at their home in Beverly, N.J. Rufe is president of the Pedrick Tool and Machine Company of Philadelphia. Daughter Mary is in her second year of high school. Dave Woodbury recently delivered a lecture at Cooper Union on "Possibilities for Industrial Power in Atomic Energy." Ted Rose is reported to be residing in New York City.

Stanley L. Scott, a major general, has been stationed in Alaska, where he is commanding general of the Army, according to word from his son, William B. Scott '44. In the ex-brass department is Douglas W. Coe, a former Navy captain, who is now a professor in the mechanical engineering department of the Georgia School of Technology, Atlanta.

Reminder: On Alumni Day, Saturday, June 12, the Class will hold its customary meeting at the Statler at 4:00 p.m. — CAROLE A. CLARKE, Secretary, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

1923

I hope you have your calendars all marked for Saturday, June 12, which is Alumni Day at Technology in Cambridge and also the beginning of our 25th reunion. The reunion itself will follow at New London, the Griswold Hotel, Sunday night, June 13, through the 16th. There are two things you must keep in mind to do. The first is to reply to mailings about the reunion, particularly when you are asked to make advance reservations. The other thing is to make your arrangements for Alumni Day events and the Alumni Day dinner directly by responding to the general mailing regarding Alumni Day affairs which is sent out from the Institute.

At the midwinter meeting of the Alumni Association held on February 7 in Walker Memorial, the speaker was George W. Gilman, director of transmission engineering for the Bell Telephone Laboratories, who presented an extensive demonstration on radio in modern telephony. Quite a number

of other '23 men from around Boston turned up at this meeting.

Joe Nowell was mentioned in the New York Herald Tribune in February, on the occasion of being appointed manager of the engineering and construction department of the General Electric Realty Corporation of Schenectady. — Edward J. Danehy was elected assistant superintendent of schools in Cambridge in January. He became mathematics teacher in the Cambridge high school in October, 1923, and headmaster in December, 1937.

Forrest F. Lange was put in charge in December of a newly established mobilization planning section set up by the United States Navy Bureau of Ships at the Portsmouth Shipyard, Portsmouth, N.H. He was formerly administrative officer and housing project representative with the Federal Housing Administration in Boston.

I regret to have to report two deaths. Herbert H. Flather died suddenly of a heart attack at Nashua, N.H., on January 23. After graduation from Technology, he was with his father for several years in the Flather Company, manufacturers of machine tools, and was later in the machine tool industry in Fitchburg, Mass. He leaves a wife and two sons and a daughter.

The other is Howard W. Dexter, Jr., who died in Pittsburgh on January 8. I had had a Christmas card from him from a Pittsburgh hospital. — HORATIO L. BOND, Secretary, National Fire Protection Association, 60 Batterymarch, Boston 10, Mass. HOWARD F. RUSSELL, Assistant Secretary, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1924

Although this is a last minute note to The Review, I am passing along to you herein, at the risk of repetition, some news on our 25th reunion in 1949. Arrangements have been completed for our stay at the East Bay Lodge, Osterville, on the south shore of the Cape. They can accommodate about 200 men, but should we overrun that mark, and I hope we shall, they will make arrangements to take care of the overflow. Tennis, golf, bathing, and riding will be available, and we will give you more details as they come along to us. Cy Duevel is planning to send out a reservation card in the near future. When you get it, don't let it lie around and get lost. Please fill it in at once and send it back, with whatever deposit is required, so that we can begin to know about where we are headed. If prices have come down (don't faint), either a refund or credit will be allowed you on arrival.

I haven't seen many of the boys of late. Bill Robinson was in town a few weeks ago, for a General Electric meeting, but I didn't see him. I run into Bill Keplinger and Mal MacNaught frequently and had a call from Anatole Gruehr not very long ago. Bill Correale is out of the Army now, doing a few odd consulting jobs, when he isn't in a conference with some municipality, trying to convince them that his ability is just what they need, at a price.

More news next time. I saw Henry Estill last week for a change. He's a manufacturer's agent in St. Louis. — FRANCIS A. BARRETT,

General Secretary, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, Assistant Secretary, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

1925

In bringing our class records up to date, I have just finished posting 172 notices received from the Alumni Association during the past year. Ordinarily I do this as they come in but this time have had to postpone it until now. Among these notices are two concerning deaths of members of the Class not previously reported in these notes. Augusto S. Bruna, who had been living in London as representative of the Chilean nitrate interests, died on August 5, 1946. Word was received from his brother last May, but no further details are available. Bruna was a graduate in Course III. Raoul R. Gamache, II, who was connected with the General Electric Company at Schenectady, N.Y., died on June 20. The cause of his death is not reported.

It is, of course, not possible to take space in these notes to list address changes, but in a number of cases, there are new company affiliations, and the like, which justify reporting them. Some of them may not represent a change of jobs, but only of location. More details will be appreciated, and will be duly reported if received.

Willard Asbury, X, has returned from London, England, to Colonia, N.J.; Andrew Aylies, X, is with the Harshaw Chemical Company, 1945 East 97th Street, Cleveland, Ohio; Captain Hoyt S. Baker I report because of his numerous changes — Long Branch, N.J., to care of the Fidelity Philadelphia Trust Company, a forwarding address which he has used before, to the Pacific, where he may be reached through the address 972 Signal Service Battalion, APO 958, care of Postmaster, San Francisco, Calif.

Ben Beale, X, is with the Joanna-Western Mills Company, 22d and Jefferson Streets, Chicago 16, Ill. Evidently this represents a change in the name of the firm, which was the Western Shade Cloth Company. Henry Brousseau, X-B, is located at the General Latex and Chemical Corporation, 666 Main Street, Cambridge, Mass. Thomas R. Camp, I, is a member of the firm of Camp, Dresser and McKee, 6 Beacon Street, Boston 8. Maurice C. Conkey, Jr., I, reports that he is with the California Packing Company, 101 California Street, San Francisco, Calif. (Note the name of the state in every line of the address except Conkey's name — or what does middle initial stand for?)

F. Graham Cunningham is now with the Heyden Chemical Corporation at Morgantown, W.Va. Henry Doble lists his address as in care of the Henry Doble Co., 155 Sansome Street, San Francisco 4. Both the latter are Course X men, although Doble is a nonassociate. James R. Geddes, V, is located with Associated Traders, Inc., 15 Exchange Place, Jersey City 2. Ted Kuss, I, is with L. H. and B. L. Nishkian, 1045 Sansome Street, San Francisco. (He and Doble should look each other up!) Clarence Latham is connected with the Trumbull Electric

Manufacturing Company, whose address is 60 East 42d Street, New York 17.

You may have noted that I have been listing these addresses alphabetically by names. In the second of the two following names I have changed the order because both these officers are at Wright Field. Clarence B. Lober, IX-B, a colonel, may be reached at Quarters 522A, and Edgar P. Sorensen (Aero. Eng.), a brigadier general, at Area A, Quarters 524, Wright Field, Dayton, Ohio. Coincidentally, the next name is also that of an air officer — with the Marines: Ivan W. Miller, a brigadier general, is at the Marine Corps Air Station at Cherry Point, N.C. Roger P. Moore gives his address as: D. I. Moore and Sons, 5 Washington Street, Biddeford, Maine. Karl T. Nilsson, evidently still with the same company, now gives his address as the Solvay Process Company, Drawer 271, Syracuse 1, N.Y.

Morrough P. O'Brien's new position with the Air Reduction Company, Inc., at 60 East 42d Street, New York, does not require the title of professor which he carried while at Berkeley, Calif. He and Latham, with offices in the same building, should take each other to lunch occasionally! John E. Ostrander, a naval captain, has been transferred from Washington, and is now at the Navy Office, Pratt and Whitney Aircraft, East Hartford 2, Conn. E. Wayne Rembert, X, is at International Bank, 1818 H Street North West, Washington 6, D.C. C. Geoffrey Roberts is with the African Explosives and Chemical Industry, Ltd., P.O. Northrand, Transvaal, South Africa. It's odd that he, an Electrical Engineer, and I, an Electrochemist, should both wind up in the explosives industry in widely separated parts of the world! How about a letter, Geoff?

Robert L. Rockefeller, IX-B, non-associate, is with Mitchell, Capron, Marsh, Angulo and Cooney at 20 Exchange Place, New York 5. Joe Russell, XV, is with Texas Solvents and Chemicals Company at 8501 Market Street Road, Houston 15, Texas. Hugh D. Stillman, VI, is connected with the Appalachian Electric Power Company, Box 1897, Huntington, W.Va. Roland H. Turner is associated with the Aetna Casualty and Surety Company, State Street Building, Harrisburg, Pa. He is a XV man. James W. Walters, a colonel, has been transferred from Cincinnati to Augusta Arsenal, Augusta, Ga. He was in Course II while at the Institute. Edgar R. C. Ward, VIII, a lieutenant colonel, reports that he is at United States Army Caribbean Headquarters, Quarry Heights, Canal Zone. William R. Wheeler, VI-C, is currently with the American Telephone and Telegraph Company, 1809 G Street North West, Washington, D.C. Richard M. Wick, X, is now in the research department of the Bethlehem Steel Company, in Bethlehem, Pa. I believe, however, that this is not a wholly new connection.

Now we turn to several more complete items. The first concerns Henry Cunningham and is a clipping from the Boston Post of January 10: "Two illegal parking charges . . . were nol-prossed by Assistant District Attorney McAuliffe in Suffolk Superior Court yesterday when Mr. Cunningham's

appeal came up for a hearing." The item continues with the details of the reason for the nol. pros., and adds that "Mr. Cunningham . . . is an M.I.T. graduate, and a civil engineer with a Boston office on Tremont St."

Next, Gordon Creveling, whose address is 2901 Thornhill Road, Birmingham, Ala., wrote Professor Locke '96 that he has a job which keeps him busy indeed as superintendent of the Wenonah division, Ore Mines and Quarries, Tennessee Coal, Iron and Railroad Company, but that he hopes to get everything well organized some day. He finds it very different from handling Mexican labor and carrying on Mexican mining operations. He further reported that his brother Don, of the Class of 1924, who is now entirely out of the mining business, had recently had a hard siege of virus pneumonia with complications but was then happily on the road to recovery.

Basil Blonsky has recently been on a short professional mining trip to Mexico bucking the elements. He is still with the Mudd mining interests in Los Angeles. His mother joined the family in September, coming from China by airplane. This last will be good news to the Count's friends, considering all the upset conditions that have prevailed in Manchuria during the last 17 years.

The following news release speaks for itself: "The appointment of Howard S. Nelson as general manager of Daystrom Laminates, Inc., Daystrom, N.C., has been announced by Thomas Roy Jones, president of American Type Founders Inc., Elizabeth, N.J., the parent company. Daystrom Laminates is an A.T.F. associate in the hardwood plywood field. Mr. Nelson is a native of Helena, Ark., where he attended the local schools. He was graduated from M.I.T. in 1925 with a B.S. degree in administrative engineering [probably Engineering Administration, XV.—H.F.W.]. Before going to the Daystrom company, he operated his own business, the Rockwool Manufacturing Company at Birmingham, which he established in 1945. He brings to his new post 24 years of experience in all phases of lumber and veneer manufacturing. In 1925, Mr. Nelson entered the lumber business as an industrial engineer with the Pinsett Lumber Manufacturing Company, a division of the Singer Manufacturing Company, at Truman, Ark. Three years later he was made manager of a subsidiary plant in Vicksburg of the Hardwood Products Corporation of Neenah, Wis. In 1930, he became a member of the industrial engineering staff of the Penrod, Jurgen and Clark Company of Kansas City, and in 1931 he joined the Howe Lumber Company of Helena. He later accepted a management-partnership with that firm and remained there until 1945. Mr. Nelson is married to the former Mary Seaton of Helena. They have four children; Edward S., William, Thomas Howard, and Charles Morse Nelson."

There is to be a dinner in honor of "Dean" Lobdell '17 given by the M.I.T. Club of St. Louis, on February 19, and I expect to be there and to look up any '25 men who may appear. You'll hear about this in the May notes.—HOLLIS F. WARE, General Secretary, P. O. Box 52, Godfrey,

III. F. LEROY FOSTER, Assistant Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

1926

While in Pittsburgh recently, the Secretary had the pleasure of seeing Mark Greer, Maurice Davidson, and John Larkin. All these people seem to be flourishing citizens of Pittsburgh. Mark Greer is vice-president in charge of engineering for the E. L. Wiegand Company; Maurice Davidson is general commercial engineer for the Bell Telephone Company of Pennsylvania; and John Larkin is chief metallurgical engineer of the Firth-Sterling Steel Company.

Pittsburgh is quite a center of '26 men, and out of the directory of the M.I.T. Club of Western Pennsylvania, the Secretary has noted the following names in addition to those mentioned above: Peter L. Bellaschi, James A. Drain, Jr., John A. Gibson, William Goodridge, Wesley C. L. Hemeon, Donald C. Hooper, Raymond Mancha, Philip W. Robinson, Henry A. Sargent, Ralph C. Stiefel, Jr., and William M. Work.

The Secretary has had letters recently from Elton Staples, who is district manager of the Hevi Duty Electric Company in Cleveland, and from Jim Bamford, who is executive director of the Community Chest of Berks County, Pa. Elton, as I have reported earlier, has a son at the Institute at the present time. Jim has had two articles published recently, one in the Rotarian for August and the other in Community Magazine for October, both arguing for a more scientific attitude in the planning of community services and charities. The Secretary was interested to note in the newspapers that Herbert Wills has been promoted to the position of assistant vice-president in the public relations department of the Central National Bank of Cleveland.

A. W. K. Billings, Jr., has returned to Boston from Rio de Janeiro. He is with the Gillette Safety Razor Company and had been their representative in South America for a short time. From the address changes passing through the Alumni Office, the Secretary notes that Charles Rickerson has left Pittsburgh and is now traffic equipment supervisor for the American Telephone and Telegraph Company in New York City; that Stanton L. West, who served as a major in the war, has returned to the R. C. West Tool and Die Corporation in Depew, N.Y., of which he is vice-president; that Harry L. Weinstein is now an electrical designer with Day and Zimmerman, Inc., in Philadelphia; that Augustine Cotter is a civil engineer with the Navy Bureau of Yards and Docks at M.I.T.; that F. Ritchie Marindin has left Port Washington, N.Y., and is a project engineer for Doran Brothers, Inc., in Danbury, Conn.; that Irving L. Lind is now living in Berkeley, Calif., and is a chemical engineer with the Bechtel Corporation in San Francisco; and that Reginald Macauley, who was with Raytheon during the war, is now a general contractor and builder in Lowell, Mass.

Two deaths must be regrettfully recorded. The first is that of Moses Navisky of Boston, of whose death on September 21, 1946, we have only recently learned. The other is the death of Albert E. Mulliken, husband

of our classmate, Mary Jeremene Sullivan. He died suddenly on March 12, 1947. Mrs. Mulliken is continuing to live in their home in Silverton, Colo., and has four children. The oldest, Harry, is still in the Marines, another son is at the University of Colorado, and her two daughters, Judy and Sharon, aged 13 and five, respectively, are at home with her. Mrs. Mulliken is teaching school now and in writing recently to Professor Samuel C. Prescott '94, here at the Institute, she said that she hoped she might get east this summer. — JAMES R. KILLIAN, JR., General Secretary, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

We regret to advise you of the death of Isaac W. Stephenson on November 28 in an automobile accident. The last word we had of Ike was that he had bought a BT-13 and was leaving his job with American Airlines for the West. His address at Tucson, Ariz., was Route 4, Box 215. This news brings great sadness to those of us who saw Ike in Washington and Wisconsin and at Wright Field during the war and watched his gradual promotion to the rank of colonel.

Our Class can now boast of another admiral in its ranks. The East Boston Times of November 26, records the promotion of A. J. Wellings, II, in the following terms: "President Truman has announced the promotion of Capt. Augustus Joseph Wellings, son of John Wellings, to Rear Admiral. Admiral Wellings is one of four brothers who are graduates of Annapolis. Admiral Wellings is a graduate of High School of Commerce and was admitted to the . . . Technology prep school. He had been appointed by Congressman Peter Tague of the East Boston district. Admiral Wellings, inspector of naval material in the Bethlehem, Penn., district, had been promoted to the rank of captain in 1942. The Navy advanced him in recognition of his feat of expanding production in the area under his supervision. He later served as assistant Ordnance Officer at the New York Navy Yard. He was in charge of the metallurgical and training division, Naval Gun Factory, Washington, D.C., and commanding officer of the U.S.S. Arctic. In June, 1940, he was assigned to duties in the Bethlehem district." The present Rear Admiral Wellings was a captain in 1945 and a commodore in 1946.

Erik Hofman and Mrs. Hofman recently arrived in Buenos Aires, Argentina, where he will be located for two years with the West India Oil Company. This post represents a continuation of Erik's association with the Standard Oil Company of New Jersey and its various associates. Before this assignment he was with Intava, Inc., which marketed Standard of New Jersey's aviation products throughout the world. — Speaking of Standard of New Jersey, now that they have moved their offices from 26 Broadway to Radio City, I see Bud Fisher now and then. His particular interest is special product research and development.

For many months, I have been meaning to write something about Ray Buckley, who is a neighbor of mine. Last summer his promotion to managership of the Du Pont Company's fabrics and finishes department

was announced. The following is quoted from the Wilmington, Del., News on this subject: "J. Warren Kinsman, general manager of the fabrics and finishes department of the Du Pont Company, announced . . . appointment of James R. Buckley as manager of the fabrics division, . . . Mr. Buckley had been assistant manager of the division since Nov. 5, 1945. Mr. Buckley has been with the Du Pont Company for 20 years. He was born in Philadelphia in 1903. He was graduated from George Washington University at Washington, D.C., with a bachelor's degree in chemistry in 1924, and from . . . Technology in 1927 with the S.B. in Chemical Engineering. He went to work as a chemist at the Du Pont finishes plant in Parlin, N.J., in 1927. During 1927 and 1928 he studied industrial organization and management at Rutgers University."

Right now Ray is in the New York Hospital, where he underwent an operation, but he will be back home in a few days to get ready to go back to work. — JOSEPH S. HARRIS, General Secretary, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

1928

Since our last notes were compiled, the first notice of our 20th reunion, scheduled to be held at the Wianno Club on Cape Cod on June 25, 26, and 27, has been mailed. Although the returns are only fragmentary, the following men have signified their intentions of being present: Bill Bendz, George Bernat, Bill Carlisle, Jack Chamberlain, Chet Day, Jim Donovan, Roland Earle, Hank Harrington, Ralph Jope, Bill Kirk, Tom Larson, Frank McDermott, Slim Maeser, Dave Mathoff, Dick Rubin, René Simard, Walt Smith, and Jim Willett. Additional names will be published in forthcoming issues. We hope to include yours among them.

Carl Loeb continues his climb in Climax Molybdenum. For a period of years he has been vice-president of Climax, and only last January he was made a director of the corporation. Congratulations of the Class. Herman Krantz, who has been in South America most of the time for the past 20 years as a representative for the Otis Elevator Company, called at M.I.T. recently en route to a new assignment for Otis in Italy, where he will be located in Milan. Word has recently come to us of the promotion of George Houghten to be general manager of the Metropolitan Body Company, a division of the International Harvester Company. Congratulations. William Hurst, X, is now reservoir engineer for the Shell Oil Company in Houston. Bill recently visited New York to attend the meetings of the American Institute of Mining and Metallurgical Engineers and came on to M.I.T. for a short visit. Although a native Bostonian, Bill favors the wide-open spaces of Texas. He has two boys, aged 10 and 12. Bill reports that he occasionally sees Bill Woods, who is with the Gulf Oil Corporation, and Herb Dayton, who is with the Humble Oil and Refining Company. Both are located in Houston.

In response to the reunion publicity, Hennie Dean writes from Bonsall, Calif., that

distance will prevent him from attending the 20th. He sends his classmates his best regards. Hennie reports that he is enjoying life very much as a rancher in Bonsall, where he grows citrus fruit and avocados. He states: "I'm having more fun and real living than ever before in my life."

It was a real pleasure to get a letter from John Praetz with a few news items about the Class. First he enclosed two copies of minutes of the M.I.T. Club of Chicago, in which he and Stan Humphrey are both very active. Stan is secretary of the club, and John was recently chairman of one of the evening programs put on in Chicago. Stan Humphrey is now one of the partners in the management engineering company, Booz, Allen and Hamilton. Bob Wise, VI-A, is also with this company along with five other M.I.T. men.

Also it is a pleasure to announce that the Liquid Carbonic Corporation has a new director of service and sales engineering for their machinery division. His name — J. G. Praetz. Congratulations, John, very nice going, and incidentally, thanks a lot for your letter. — GEORGE I. CHATFIELD, General Secretary, 49 Eton Road, Larchmont, N.Y.

1931

The news is a bit scanty, but just to make sure that the Review Office doesn't scrap its 1931 type, here goes.

Retentive memories may recall recent propaganda in this column challenging other courses to equal Biology's record in providing class notes. Jerry Cook, one of Professor Schell's bright young business engineers, has entered the lists for Course XV. He writes as follows: "Since my 'decommissioning' from the Navy, I have been making the most of my Course XV education as an industrial and financial consultant for Lehman Brothers, investment bankers. The work fits me like a glove, and there is plenty of incentive attached to it. Need I say more? I am ensconced in Plainfield, N.J., and surrounded by a happy and active family consisting of my wife (Mildred Libby Cook), and two children, Patricia, age seven and one-half, and Roger, age four and one-half, and that, in brief, brings me up to date." Now, if we could only smoke out some more of these XV boys who are well on their way to fame, fortune, and larger donations to the Alumni Fund. . . .

Speaking of the Alumni Fund, its Director, Chick Kane '24, has announced that any of you who crave a 1931 "Technique" may obtain one by sending \$4.00 to Technique, Walker Memorial, M.I.T.

Dan Cupid manages to sink an occasional shaft into one of our matrimonial hold-outs. On last December 27, Margaret R. Griffin became the bride of Raymond Jacques, II. He is employed with Taft-Pearce in Woonsocket, R.I.

Two classmates were kind enough to drop in on the Class Secretary in recent months. Syd Milligan of Course X-B fame reports that he is helping the Navy delve into the mysteries of jet propulsion. He is married and living in Newport, R.I. And Arnold Childs, in his best Course XV manner, all but talked me into switching to Sunoco

gasoline, a commodity he is currently marketing for the Sun Oil Company in and around Providence, R.I.

A communication from Alumni Secretary Locke '96 enables us to end on a constructive note. Lincoln Gifford, whose affiliation with Signode Steel Strapping was related here earlier, writes Professor Locke that he is commuting between Chicago, Ill., and Sparrows Point, Md., in the process of helping to transform 30 acres of corn shocks into a new four-high, reversing, cold rolling mill.—JOHN N. HIGGINS, General Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

1932

Every year in February, the Technical Association of the Pulp and Paper Industry has a convention in New York City, and at that time, for the past several years, graduates of M.I.T. have had lunch together at the Engineers' Club. This year, about 60 men attended and of this group, strangely, about 10 per cent were from the Class of 1932. Being in some measure responsible for getting dope for The Review about our classmates and also, being chairman of the meeting itself, the opportunity for getting news was too good to overlook, so I buttonholed each of our classmates and asked him to lay it on the line, so that I might send a few notes in for the April issue.

Curt Cummings, whom you may remember as a member of the famous "Bitch Owls" crew of 1931, was at the convention representing S K F Industries, Inc. He lives in Elkins Park, at 535 Crefeld Avenue, and is now manager of the industrial sales department in the home office. He is married and has a son five and one-half and a daughter one and one-half. Curt looked very distinguished with a beautiful mop of gray hair. During the war, he spent more than a year with the War Production Board bearings section and possibly his duties there gave him enough headaches to turn his hair almost white.

B. M. Hutchins was on hand. He is now a project engineer for the Rust Engineering Company in pulp and paper mill work. He was formerly chief engineer for the Crossett Paper Mills at Crossett, Ark., but he changed to Rust three years ago. He married Lois Wilcoxon at Crossett in 1937, and they have three children — two boys aged nine and ten and a girl almost two years old.

Larry Whitaker stated that he is now with my "first love" in the paper industry, the S. D. Warren Company at Cumberland, Maine. Previously with the Mead Corporation and now with Warren his work has been on the development of machine coating operations. He spent the war period at Edgewood Arsenal, Md., in the Chemical Warfare Service development of firebombs. He married about seven years ago and has a red-headed son by the name of Bill, who he insists was not named for your reporter. He says that he is going to check up on Freeman Fraim and drop us a line so that we can tell you something about his activities. Too bad some of you chaps won't take it upon yourselves to let us know what you are doing, so we could have the information at first hand.

Earl Anderton has been on hand at the meeting every year since he got out of the Navy; and, as reported last year, he is back with the Marinette Paper Company division of the Scott Paper Company. He has a girl seven and a boy one (he was in the Navy 4 years)! He is living in Glens Falls, N.Y., and his current avocation is skiing every week end in northern New York. He was in Chicago in January and talked on the telephone with Joe Winkler, who is at the present time with a concern in Rockford, Ill. He had lunch with Don Fetter and had just heard that Ben Archambault has been married lately. No details were available.

Bob Emerson is living at 66 Eakins Road, Manhasset, N.Y., and now has two daughters and a son. He is still with the Manifold Supplies Company which produces carbon papers and typewriter ribbon. He is treasurer of the Men's Club of his Congregational Church and spends most of his time skiing and, in the summertime, tries hard to grow grass on Long Island.

I'll close this report by stating that my address is still Kalamazoo, Mich., and I am still looking for a letter from a lot of you fellows who should be able to find time during the year to drop us a line, and let us know what you are doing.—CLARENCE M. CHASE, Jr., General Secretary, 1207 West Seventh Street, Plainfield, N.J. Assistant Secretaries: CARROLL L. WILSON, United States Atomic Energy Commission, Washington 25, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1934

Frank R. Milliken has just been promoted to the position of plant manager of the National Lead Company, for the titanium division of the MacIntyre Development at Tahawus, N.Y. This is an important position putting him in full charge of this large mining enterprise, which undertakes the mining of nearly 5,000 tons of magnetite-ilmenite ore a day in the Adirondacks. The plant was built during the war as a source of titanium when foreign supplies were no longer available. Frank has been with the company from the very beginning of its Adirondacks operations, having to do originally with the construction of the concentrating mill, and more recently holding the position of assistant plant manager.

Henry N. Andrews, Jr., has been appointed acting dean of the Henry Shaw School of Botany at Washington University, St. Louis, Mo. Henry, who has been an associate professor of botany at the university for the past two years, will begin his new duties in September. He received two advanced degrees from Washington University and also studied in Cambridge, England. He was appointed assistant professor at Washington University in 1942 and became an associate professor two years later. A specialist in paleobotany, Henry is the author of a book, *Ancient Plants*, published this month. He is a member of Phi Beta Kappa, Sigma Xi, honorary scientific fraternity, the Torey Botanical Club, and the Botanical Society of America and is also a fellow of the American Association for the Advancement of Science.

4

Sydney Nashner, formerly chief engineer of the Salem aluminum plant of the Chemical Construction Corporation, is general superintendent of the Columbia Metals Corporation in Salem, Oregon.—Kevin Malone, of Red Mountain, Calif., was in the East in July in connection with tungsten developments.—Harold S. Adams, who is chief sanitarian of the state public health department in Minneapolis, has been appointed director of the hotel inspection division by Governor Youngdahl. Harold is also a faculty member of the University of Minnesota school of public health.

Arthur Smith has just resigned his post as district engineer of the Torrington Company despite the offer of a better post at the company's home office. He plans to become a manufacturer's agent in the textile field. Arthur, who has headed much development work in textile machinery for the Bantam Bearings Division of Torrington, says he would like to try other branches of textile work for a while.

We ran into Hal Reynolds a short time ago. He is with the Turbine Equipment Company of New England, on Federal Street in Boston. After leaving Technology, Hal went on to Harvard Engineering to absorb more learning. He then spent six years with B. F. Sturtevant and a year with Stone and Webster. During the war, he was in charge of the small arms division of the Boston Ordnance District. His present work is engineering and sales. He is living at 127 Elgin Street, Newton Center, with his wife and little two-and-a-half-year-old daughter.

Fred Vaughan has joined the ranks of the married men. He was married on January 31 to Elizabeth Faber, daughter of Mr. and Mrs. Charles Ogden Faber of Brooklyn, N.Y. Fred is now co-ordinator of the Grinnell Lithographic Company of New York.—Benjamin Malin was married in October to Rosalyn Rosengard, daughter of Mr. and Mrs. Abraham Rosengard of 95 Coolidge Street, Brookline, Mass. Ben is working as an engineering consultant in Boston and Providence.—Horace L. Woodward was married on August 15 to Eugenia Clark, daughter of Mr. and Mrs. Arthur D. Clark of 1136 Bank Street, Hillside, N.J. Horace is now employed by the Weston Electrical Instrument Corporation of Newark, N.J.—Louis Zolan was married on August 31 to Evelyn Hyman, daughter of Mr. and Mrs. Wolf Hyman of Bridgeport, Conn.—JOHN G. CALLAN, Jr., General Secretary, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, Assistant Secretary, Chile Exploration Company, Chuquicamata, Chile.

1936

A letter from El Koontz informs us that after 10 years he is still with Reliance Electric and Engineering Company and is now in their New York office, after having been in Cleveland, Philadelphia, and Minneapolis (where he acquired a very attractive wife). El has a four-months-old daughter, Virginia Anne, apparently acquired somewhere between Minneapolis and New York. Within 500 feet of his homestead in Larchmont he has as neighbors Jack Stapler, who is a quality engineer for the American Machine

and Foundry Company, and Louis Smith, a patent attorney for Union Carbide and Carbon Company. Jack Stapler has two children, and Louis Smith, one child. (El is a fairly poor sex determinator for he merely lists these offspring as children.)

Mal Holcombe lives in Pelham, and he and his wife, Vivian Swaine Holcombe, have three children. A recent note from Mal confirms El's report that he is with Blair, Curtis and Hayward; and since his name appears last in the list of partners, we assume that Mal is 16th partner in this firm. — Nat Ayer had dinner with El Koontz recently and revealed that he is in personnel research with the Atlantic Refining Company in Philadelphia and has two offspring. Fletch Thornton was in Boston for a few weeks some time ago learning the rubber roller business at Stowe-Woodward and is now a sales engineer for the W. E. Greene Corporation in New York. He is back in his old home town of Summit, N.J., apparently thriving in his new work.

El reports that Gordon Thomas has just returned from England and Palestine for the Lummus Company. He felt that the shooting he saw in Palestine was not part of his engineering job. C. Donald Brown, who, in our freshman year, transferred to Annapolis, is traveling by submarine out of New London, and has a wife and four children. John A. Kleinhans (also as a freshman transferring to Lehigh) lives in Easton, Pa., where he is plant engineer for the J. T. Baker Chemical Company of Phillipsburg, N.J. Milner Wallace, who is now living in Nyack, N.Y., plans to build a house in Saddle River, N.J., so he can move his family, wife, and four children, closer to Nutley, N.J., where he is a radio tube expert for Federal Telephone and Radio.

Our President, John Austin, got himself a new wife in Chicago, and is living in Tarrytown, working for Architectural Forum. Hank Cargen is living in West Orange, N.J., and still working for Sales Affiliates, who peddle deodorants, hair dye, and similar well marked-up nostrums.

A note from Gunnar O. H. Dahlby of Västerås, Sweden, where he is chief of the relay department of the Asea Company, reports five children aged two, four, six, eight, and ten. This certainly connotes logical engineering thinking, and he states he hopes to send "some of them to M.I.T. in due time." A letter from Roger A. Krey reports that he is teaching mechanical engineering at Worcester Tech, but that he was away from things mechanical during the war as a glider pilot with "no motors, no navigation, no armament, no radar, no promotions, 'no nothing.'"

You see, some of the members of 1936 still remember how to write, and all you have to do to get your name in The Review is to send a letter to the undersigned. — WILLIAM W. GARTH, JR., General Secretary, Lithomat Corporation, 58 Charles Street, Cambridge 41, Mass.

1937

May I offer a gentle reminder about those letters you all were supposed to write to me so that we can have a real column?

Bill Wold is one of our star pupils this month with the following letter: "I have had the impulse to write on many occasions but have always managed to procrastinate until the impulse died. This letter is undoubtedly the result of a coincidental timing of several events: (1) my transfer from the home office of Consolidated Vultee in San Diego, for whom I have worked since 1939, to a new job as manager of their New York office at 420 Lexington Avenue; (2) attendance at the Technology Club's annual dinner in honor of President Compton, at which I was the only '37 representative present and met only one Alumnus whom I knew; (3) picking up The Review as I left the office to catch the Old Greenwich express and reading the class notes on the way home. My ordinarily dependable strength of resistance to all forms of correspondence failed in the face of this series of events; so here I am. And to get my own statistics out of the way quickly: After one year in the Signal Corps (Thomason Act), Convair let me go to work for them as detail draftsman. I have been with their various divisions at Elizabeth City, Louisville, and Fort Worth during the war, first in engineering, then production, ending back in San Diego in sales, where I have been until this last move last month. I met Pan American Airways stewardess Louise Saunders of Texas at the National Aircraft Show last year, and we were married last Christmas. As much as I am sold on the comfortable living of Southern California, it feels good to be back in the stimulating climate of the East, and I am looking forward to renewing friendships with classmates located here."

"For news on classmates, I can make the following contributions (all Course XVI): Frank Goddard, who left Convair before the war to join Glenn L. Martin in Baltimore, has left them to return to M.I.T. on what I believe is a military research fellowship. I spent a week-end with Frank in Baltimore last summer. He was married last year to a lovely Baltimore girl. Al Roshkind, who was a Glenn Martin project engineer until last year, now has one of the finest positions of the Class as chief engineer of the A. B. Dick Company (duplicating machines) and lives in Chicago with his beautiful Baltimore wife, Pat, and two children. Al Varrieur is chief service engineer at Martin, has been there since school, and is still a bachelor, very confirmed. Bill Bergen, also, is still at Martin, but Jim Clifford left them a year or two ago to go into the boat business in Baltimore. Norm Robbins has always been with Convair, was chief of structures of our Fort Worth division the last I heard, is married [and has two small children].

Ted Gramse was with me out in San Diego before the war but left for Martin and later Republic and is now with the guided missile division of Fairchild and living in Huntington, Long Island, married, with two children. Pitkin is with Lockheed in Los Angeles (Burbank) and was president of the M.I.T. Club of Southern California when I saw him. Duane Wood, a Course VI man who found his way into aviation, is production manager of the Lock-

heed Aircraft Service Corporation in Burbank; he ran production for their overseas base in Glasgow during the war, married, and has a cute little daughter. Francis X. (Ravelli) Maida (whom Lieutenant Bicher used to call 'the missing Mr. Maida,' always absent from Signal Corps code classes), worked for Bell Telephone for years; he is now starting his own electrical equipment manufacturing business. I saw him at his parents' farm in Eatontown, N.J., a few weeks ago; he married his schooltime sweetheart, Georgie Taylor, and has the cutest little daughter, who rules the family. I saw George Rosen, who was visiting our plant in San Diego a few weeks ago; I forgot whether he said he was with Pratt and Whitney or Curtiss and recall that Al Hale is a sales engineer with Pratt and Whitney in Hartford.

"I wonder where Dick Surbeck is now. And everyone I meet wonders whatever happened to Ichiro J. Takahashi, who seemed much too easygoing and good-natured to go back and design bombers to be used against his classmates (I wonder if he did). That's all I can think of now. I hope some of it will be news to you and that it may help to stir a few more Course XVI lads out of their lethargy, reverie, beer, or whatever they may be in."

Charles R. Kahn, Jr., writes us the following letter: "Inasmuch as the last dispatch had me recently married and still engineer officer on the U.S.S. Manila Bay, it's about time for a recent release. The enclosed clipping from the New York Times of October 29 gives the data on our 'first release,' a son, Paul Wyant, named for his great-uncle. I've been out of the Navy and back in air conditioning since February, 1946, and am now doing sales engineering work with the Broadway Maintenance Corporation, the Chrysler Airtemp dealers here in New York. We are sorry we had to miss the reunion, but give my regards to any of the fellows you see."

Jane Phyllis Smith was married to Ed Hobson around November 30. He received his advanced management certificate from the Harvard Graduate School of Business Administration in 1946, served in the Army from 1941-1946, attaining the rank of lieutenant colonel, and was awarded the Legion of Merit and commendation ribbon. — Norma Cohen of Waterbury, Conn., became the bride of Albert I. Blank on December 16. Albert is a metallurgist at the Chase Brass and Copper Company in Waterbury. — Shirley Babbitt Haight became engaged a few weeks ago to Arthur Barry. The bride-to-be attended West Virginia University and the University of Toronto and is a physiotherapist. Art, of course, is still with E. I. du Pont de Nemours and Company at their Belle, W.Va., plant.

Walt Blake is now with the research products development division of Pillsbury Mills, Inc., in Minneapolis, Minn., as assistant to the vice-president in this division. — T. Norman Wilcox was recently named manager of the methods and equipment laboratory of the General Electric Company's plastics department. Norman began in 1936 as a member of the student test course. He went to Pittsfield in 1938 upon his graduation from

"When Good Fellows Get Together . . ."

the course in the engineering section, then to the Taunton works as a product engineer, then a year later back to Pittsfield in the methods and equipment laboratory. Norman has two sons.—Walter G. Regnery has been named general manager of the Joanna Cotton Mills Company of South Carolina.

Van Buren N. Hansford of Pittsford, N.Y., recently purchased the Morley Machinery Corporation, Rochester, N.Y., which manufactures special machinery. He served three years in the Navy and for the last year and a half has been employed by the Wilmot Castle Company, Rochester.—P. William Bakarian is now running a factory in Liverpool, England, and putting out 300 pressure cookers a week.

Walter H. Sherry is now a professor of electrical engineering at the University of Buffalo and also a consulting engineer. Professor Sherry found that VI-A not only helped him to relate practical work with theory but also gave him insight into the importance of human relations. He says that he now realizes some of the advantages that Professor Schell's boys have and could use a bit more of that sort of training.—Maurice E. Bell of Walhonding, Ohio, was awarded the President's certificate of merit by the Assistant Secretary of the Navy for Air, John L. Sullivan, on October 30 for his services as a member of the Operations Research Group under the sponsorship of M.I.T. Dr. Bell was cited for his outstanding contributions to the country's war effort. One of the original members of the O.R.G. and formerly assistant director of the group, Dr. Bell studied all phases of air attack techniques against submarines and nearly lost his life in a crash during some of the experimental work. His work resulted in a definite increase in the effectiveness in the use of low-level sights, rocket fire, and radar research equipment.—Gil Mott is now head of the processing department at the Bridgeport Brass Company.—Dick Young writes Walt Blake: "I had lunch in Detroit with the fellow who gave you a lovely corsage of rotten crab at the reunion." We would guess Dick means Jerv Webb—who else is the fish peddler of '37?—Harry Goodwin informs us that he is now with the applied physics laboratory at Johns Hopkins and that his wife and new son will soon join him at their new home in Silver Spring, Md.

All we need for this column is two or three letters with some news to make it worth while reading. We shall await the mailman's deluge! And will all you purveyors of news please note your new assistant scribe's new address in the signature below.—WINTHROP A. JOHNS, General Secretary, 34 Mali Drive, North Plainfield, N.J. WALTER T. BLAKE, Assistant Secretary, Research and Products Development, Pillsbury Mills, Inc., Minneapolis 2, Minn.

1938

Well, fellows, it won't be long now until you'll have the opportunity of greeting all your graying classmates at our 10th reunion. You'll be surprised to see the fellow who used to work in the lab with you and is now the father of two cherubs—or at least the godfather! You'll want to talk over all the things you did together and what you've

been up to since then. So send in your reservations today, if you haven't already done so. Arrangements have now been made to hold our reunion at the Mayflower Hotel in Plymouth, beginning with dinner on Thursday, June 10, and continuing through breakfast on Saturday, June 12, which is Alumni Day. We can thus adjourn directly to the general festivities in Cambridge and Boston. The charges at the Mayflower will be approximately \$23 a person. We hope that by the time you read this, you will have made your own plans to join the gang in Plymouth.

In February, we had a small preliminary reunion in New York when 14 of us got together at a meeting of the M.I.T. Club of New York. Those present were Ed Bentley, Paul Black, Lou Bruneau, Joe d'Angelo, Jim Gilliss, Bert Grosselfinger, Ed Hadley, Harold James, Charlie King, Dale Morgan, Jack Phillips, John Rote, Bill Shamban, Fred Strassner, and Dave Wright. A follow-up beer party in April is planned, and we hope to double the number attending.

Ed Hadley registered a complaint with the class notes (and who doesn't have one!) that the announcements of two children in his family appeared in the '05 notes but not in the '38 notes. Well, now you know about them, and Ed will be glad to tell you the details at the reunion. Dave Wright is president of the Lake Tankers Corporation, operators of ships on inland waterways. Harold James is practicing patent law in New York, is married, and lives in the big city. Bill Shamban is with United States Industrial Chemicals in New York (when he isn't at the Newark plant or commuting to one of their other plants). Ed Bentley has started a scientific instrument company (any kind of instrument, he says) and would be glad to make up anything in the way of optical, electrical, electronic, or other types of gadgets to meet your requirements.

Because of a few complications (a third addition to the family, plus a series of sicknesses and devotion to office duties), your Secretary has missed reporting for two months and so has some news to record, with apologies, that was received last fall. Fred Viles announces that he is now attending Harvard for an Sc.D. degree—more power to him! George Morel is located temporarily in Meadville, Pa., out of St. Louis, where he is normally located with the American Brake Shoe Company. He states that he is definitely planning to attend Reunion Ten.

We had a very interesting and lengthy letter from Russ Coile and his wife. They are living at Virginia Beach, where Russ is doing some work with the Operations Evaluation Group in the office of the Chief of Naval Operations. He reports as follows: "The second week I was here, I went out for a two weeks' cruise with a task force testing some new equipment. I was on an aircraft carrier for the first 10 days, and then I transferred at sea in a small boat to a cruiser for the rest of the trip. Our job is to help test equipment. . . . We devise experiments, analyze data, and write the reports." Russ adds, "I think Vern Lippitt is back now at Northwestern. I got a letter from Switzerland last year when he was on

vacation from his Rhodes Scholarship in England. Fred Schmitt is reported to be purchasing chemicals for Merck and Company at Rahway, N.J. Bob Landay is now at the Bell aircraft plant in Buffalo doing some guided missile work. Bill Whitmore is also in the Operations Evaluation Group of the Navy as a mathematician. He received his Ph.D. from California."

Tice Boissevain wrote last fall that he was touring North Carolina, inspecting grocery warehouses for Stop and Shop, Inc., for whom Tice works as assistant director of warehousing and transportation. Standard Oil Development of New Jersey is well stocked with '38 men, we hear. Arnold Kaulakis is there, and goes home every night to his family consisting of a girl and twin boys. Olie Kangas, Chuck Jahning, and Jack Phillips are also at the Development labs. Elmar Piel is with the New York office of the Barrett Company, manufacturers of coal tar chemicals. Although he left Technology after our junior year, Jack Robbins wanted to be remembered to all of you. He is with the Robbins Lumber Company in Pitman, N.J.

Frank Atwater writes from New Britain, Conn.: "As for yours truly and better-half Marion, after a Bermuda wedding trip last spring, we settled down in our rambling, colonial house here atop Steele-Street hill. Needless to say, we've been most busy fixing our home to our liking. Gordon Hunt is no longer in this vicinity, having accepted a position with the Kingston Manufacturing Company. He lives in nearby Durham, where he and Betty have taken over a lovely old New England farmhouse. Howie and Edna Banzett are the proud parents of Robert Bruce Banzett, who arrived on August 16. Tony Smith has moved up the ladder at Stone and Webster's Richmond office, where he recently assumed added supervisory duties. Joe Krenn is now product engineer with Fafnir Bearing Company and this year is secretary of the M.I.T. Club of Hartford."

And from Johnny Burke comes the following: "I have been in Pittsburgh for the last two years as branch manager of Cummins Diesel Engines, Inc., distributors of high-speed Cummins Diesels. We are living just outside of Pittsburgh and have one daughter, 10 months old. I ran into Fred Hurley early in the summer in Pittsburgh. Fred is a major in the Chemical Warfare Service and is now considering the possibility of entering the Regular Army as a career. I saw Carle McEvoy in Chicago last June. Carle is working for the Acme Steel Company and has two children, a girl and a boy. Fred Hurley was being transferred to Chicago, and I told him to look up Carle. They may have gotten together by this time."

King Coombs states that he is "thinking of making Reunion Ten this year," and we hope that by now those thoughts have crystallized to a definite plan to be there. He is in Erie, Pa., and has probably by this time seen many of you in the neighborhood of Cleveland. Mat Wochos, as chief engineer of the Elgin National Watch Company, Sapphire Products Division, has been going seven days a week but has hopes of seeing some of the fellows around Chicago.

He is at Aurora, Ill. Tony Smith [How does he rate two mentions?] has made his plans to be in Boston in June, and we hope he will make it. He also states that Curtiss Torrance became the father of Minni Ray Torrance on August 17. Curtiss and family now live in Arlington, Mass. He is with Charles T. Main and was transferred to Boston last summer from Augusta, Ga.

From Dick Vincens we learn that he "added a new son to his roster" on October 11. Congratulations, Dick—and to Mrs. Vincens! We have heard from Paul Tillson several times; the latest is that he is going to law school five nights a week (and will continue until January, 1949) in Washington, D.C. Paul is with the patent law firm of Semmes, Keegin, Robinson and Semmes. He reports having seen Howard Schlansker in law school but not recently.

If you haven't already done so, keep your seat and drop us a card for a reservation right now. We are going to have a big time! — DALE F. MORGAN, General Secretary, Carbide and Carbon Chemicals Corporation, 30 East 42d Street, New York, N.Y. ALBERT O. WILSON, JR., Acting Assistant Secretary, 32 Bertwell Road, Lexington 73, Mass.

1940

Montgomery Ward and Company has recently announced the appointment of Willard L. Morrison, Jr., as co-ordinator of industrial design on the staff of Paul R. MacAlister, director of interior decoration and industrial design. Mr. Morrison will act as liaison and assistant to Mr. MacAlister in a new and all-inclusive program covering the design of all Montgomery Ward merchandise. Mr. Morrison has supervised product development for the West Bend Aluminum Company since 1940. He recently organized for them a postwar development department to co-ordinate all activities relating to a wide diversification of new products ranging from aluminum and stainless steel utensils to the styling of outboard motors.

One of our class members whom many of you will recall, John H. Hollomon, won the 1947 Nobel Prize for his paper, "The Mechanical Equation of State," which was published in Metals Technology of the American Institute of Mining and Metallurgical Engineers. The prize is to be presented at an early meeting of the institute, of which Mr. Hollomon is a junior member. Mr. Hollomon taught in the Harvard Graduate School of Engineering in 1941 and 1942 and served as chief of the physical metallurgy section of the Watertown, Mass., Arsenal during the war. At present he is directing research in physical metallurgy for the General Electric Company. He is the author of numerous papers on metallurgy and physics, and coauthor of a recently published book entitled *Ferrous Metallurgical Design*.

W. E. J. Hammond has joined the staff of the Air Preheater Corporation, as announced by the president of that corporation recently. Mr. Hammond was previously associated with Gibbs and Cox, naval architects, and for the past few years he has been chief of the engineering, scientific and elec-

trical branch of the design division of the Maritime Commission.

John R. Pellam was awarded the President's Certificate of Merit by the Secretary of the Navy, John L. Sullivan, for his services as a member of the Operations Research Group of the Office of Scientific Research and Development. This award was made during the later part of 1947. Dr. Pellam was cited for his assistance in the solution of tactical problems connected with submarine and antisubmarine warfare, successfully predicting the behavior of U-boats attempting transit of the Strait of Gibraltar. He assisted directly in the development of aircraft patrol tactics and the layout of search courses designed to detect enemy submarines entering the Mediterranean Sea. As a result, two submarines were sunk after detection by aircraft engaged in carrying out these patrols, which to a large extent forced the enemy to abandon the use of the Strait.

G. M. Phannemiller, a captain in the Coast Guard, who obtained his master's degree as a member of our Class, is now heading the division of the Third Coast Guard District as chief engineer. — Jay Zeamer, a power engineer at Pratt and Whitney Aircraft Division of the United Aircraft Corporation, has been elected commander of the Air Service Post, American Legion of New York.

Late in the fall of last year, Mrs. A. A. Giddings and Robert Schilling Harper were married in New York. Helen Wilson Remy and Richard Winfield Cobean were married shortly after Christmas. The announcement of the engagement of Judy Mandell to John L. Danforth was made at the beginning of the year. — H. GARRETT WRIGHT, General Secretary, Garrett Construction Company, P.O. Box 629, Springfield, Mo. THOMAS F. CREAMER, Assistant Secretary, 6 Berkley Road, Scarsdale, N.Y.

1941

H. Gordon Poole has left the Bureau of Mines and the Pacific Bridge Company and is now associate professor of mineral dressing at the school of mineral engineering of the University of Washington in Seattle. Bob Mayer has been appointed assistant to the division engineer in the aeronautics and marine engineering group of General Electric's Schenectady Works. Northrop Brown has recently been elected a national councilor for the Kanawha Valley section of the American Chemical Society for the current season. Northrop works for E. I. du Pont de Nemours and Company at Belle, W.Va., and lives in Charleston.

Johan Andersen writes as follows: "While in Cleveland, I saw Bill Folberth, Carl Goodwin, Larry Turnock, Val deOlloqui '40, and Bill Taylor '40. Folberth is now in charge of manufacturing at a wire goods fabricating shop in Cleveland called Coleman-Pettersen Corporation. He showed me through, and it was very interesting. Bill has two children. Carl Goodwin is still with Alcoa in their laboratories in Cleveland and seems to be very happy and doing well. He is married to Bill Folberth's sister, you know, and has two children. The 'Beaver' (Turnock) is also father of two and is still in law school, bearing up well under a heavy

study load. I heard that Howie Morrison is now working for Linde Air Products in Chicago—having transferred from a DuPont plant in Wisconsin." [The Alumni Office thinks Morrison is with the Oxweld Railroad Service Company in New York.]

When last heard from, Bill McKenney was with William T. Crowther and Son and living in Wellesley Hills, married, with two children. Rog Finch, Assistant Professor of Textile Technology at M.I.T., is living in Weymouth, married, with three children. Bill Bowes is engaged in research work with the basic nitrogen group at the American Cyanamid Company; he is attending Brooklyn Polytechnic at nights and lives in Stamford, married, with one child. Martin Mann, with the Popular Science Publishing Company in New York City, lives in Dover, N.J., married, with one child. Pete Gilmer of the Bell Telephone Labs in New York, is married and has one child. Leona Norman as at the Massachusetts Memorial Hospital. She was graduated from the Boston University school of medicine in 1944 and interned at the Boston City and Massachusetts Memorial hospitals. She lives in Malden. Barbara Laven Goldberg spent several years in textile consulting work; she is now married, has one child, and lives in San Francisco.

Ted Walkowicz is studying for his doctorate at Technology under Air Force sponsorship. John Mullen, who spent four years with General Electric on aircraft electrical equipment and two years with the Tagliabue instrument company, is now with Porter Instrument. Bob Meier was with the War Production Board during hostilities, then served as development engineer in aircraft hydraulics at Vickers, Inc.; at present, he has organized his own concern in Detroit to distribute brass and copper mill products in Michigan. Bob Bailey is with Eastern Airlines at La Guardia Field after four years with Panagra in Buenos Aires, Argentina, as a weather forecaster; he is married and has one child. Don Scarff was with General Electric in Schenectady until early 1946, when he transferred to Boston with the same outfit; he is married and has one child. Bill Welch is with the Oxford Paper Company at Rumford, Maine, married, with two children. He lives in Dixfield. Dick Lazarus is with the G.M.G. Paint Company in San Francisco, Calif.

Engagement releases concern Elinor Feiwell and Stan Jarrow (Vassar and Columbia versus M.I.T.), whose wedding will take place early this spring. Theresa Galoti (Montclair State Teachers) is engaged to Frank Filippone.

Chick Kane '24 tells us that a number of requests have been received by his office from Alumni desiring back copies of "Technique." Checking with Technique management, he has found that an ample supply of '41 Technique, as well as other back numbers, are available at a uniform price of \$4.00 a copy. If you are at all interested, write to Technique, Walker Memorial, M.I.T., Cambridge 39, Mass.

With regret we announce the death on September 6 of Alejandro Melchor of our Class, a colonel in the Philippine Army, at Camp Murphy, Quezon City, P.I.—STAN-

LEY BACKER, General Secretary, 101 Providence Road, Primos, Pa. JOHAN ANDERSEN, Assistant Secretary, Saddle Hill Farm, Hopkinton, Mass.

1942

Before we really get started with the "news" this month, I should like to explain why some of the wedding announcements, engagements, and other events are reported in this column so long after they have actually occurred. The column has to be written about a month and a half before The Review goes to press. The clippings and letters I receive are between a few days and a month or two old. Accordingly, when you fellows read the class notes, you must remember that the stuff you are reading is not really up-to-date but has been filtering through various channels for a length of one, two, or even three months.

We have some interesting letters this month. Hawk Shaw wrote his history, some of which has already appeared in this column. Quoting from his letter: ". . . After graduation, I snatched an M.D. degree from Harvard Medical School (any comparison with that school up the river is completely unjustified) and completed a surgical internship at the Massachusetts General Hospital. I then found myself automatically in the Army and stationed at the Aero Medical Laboratory at Wright Field, where I have been for the past two years. I find the work very interesting and my Technology background extremely useful. I get a little scared sometimes. This lab is sort of a Testing Materials lab where they use human beings instead of concrete piles. It's a perfectly straightforward matter to set up an experiment, but when it comes to looking for a test subject, one finds oneself looking at the tips of a lot of index fingers. This May, I expect to complete my work here and return to the Mass General to renew my acquaintance with clinical surgery. In the above described interval, I begat two sons, to my increasing joy. If any of the boys like Carl Jealous care to drop around, I'd be glad to give them a few pointers. The only other '42 man I've seen here is Dick Gibson, who is teaching the e.m.f.'s to a bunch of fly boys at the Air Institute of Technology here. He has a very fine wife who recently presented him with a son and heir." — I guess Hawk will be showing up in the office in a few months, and then we can get some more news out of him.

Curtis Buford, after marrying Barbara Anderson of Seattle last spring, worked in Cleveland for the New York Central. He is now in New York to process moving and has recently been appointed assistant to F. J. Jerome, who is vice-president in charge of operations and maintenance.

Warren Kaye wrote an interesting letter, from which the following is taken: "As one who has been only moderately successful and wants to brag about it, I submit the following résumé of the year A.G. (after graduation). I entered upon extended active duty May 8, 1942, with others of the Chemical Warfare R.O.T.C. class, such as Felix De Leo, Louis Iacobacci, Bill Kellogg, et al. After 18 months in the States, I was shipped overseas to New Guinea, joined Head-

quarters, V Fighter Command, as a member of the special staff, participated in the Leyte invasion of the Philippines, and left for the States from Okinawa on November 10, 1945. I accepted a reserve commission as major, went to work two years ago for the Sulphide Ore Process Company in Vermont, engaged in research and development in connection with the utilization of low-grade ores in the production of electrolytic iron and copper in powdered and sheet form. Last December 1, I accepted a position as staff metallurgist with the University of Vermont in extension of the same work for the state development commission. My daughter Carolyn was joined by her sister, Diana, on last October 21. My wife is the former Mary Deyerdond of Andover and Simmons."

Dan Hulett writes as follows: "Ralph and Kay Kelly have done it again! A daughter, Marcia, was born to them on January 16, and even Ralph is doing fine. This makes the second offspring. The first, Arthur (named after Art Power), was born two years ago. I have just had a letter from Albert Van der Kloot. He is still at home in Chicago and is working for the technical institute of the Independent Biscuit Manufacturers Company, a consulting lab for the industry. The big news in his life is his pending wedding."

I am sure that all the readers of this column appreciate the above letters. I hope that more members of the Class will find time to write to me.

Clifford C. Tippit, formerly a methods supervisor with the Reliance Electric and Engineering Company, has become manager of a newly created order and planning department in the same company. Ragnvald Maartmann-Moe, Jr., is working for the government as a radar expert at Horten, the Annapolis of Norway.

We have the following list of classmates (some of whom have appeared here before) who are engaged: Art Power, Clyde Hayward, Hans Aschaffenburg, Wilfred Adey, and Wallace Murray. Members of '42 lately married are these: Tom Crowley, Warren Loud, George Saathoff, William Keyes, Bill Foley, and Jack Wells. — JOHN W. SHEETZ, Acting Secretary, Room 3-108, M.I.T., Cambridge 39, Mass.

1943

As you read these notes, the 1943 fifth reunion planned this year to coincide with the commencement week program at the Institute, is now about two months away. A dinner will be held on Friday, June 11, which is the evening before Alumni Day. As I write, the details of the dinner have not been decided because we are waiting for your comments on the reply section of the double postal card which was mailed this week. If you haven't sent that back yet, how about doing it now?

Steven Heller has sent in a few details of interest. He noted that he married the former Betty McArthur on September 20. Betty is a Radcliffe graduate, and now the Heller's call 4248 Nelson Street, Chicago, home. He says also that he saw Waldo Davis in Rochester, N.Y. Waldo is with the Eastman Kodak Company, and he and

Kay were joined by young Glenn Davis on November 17. Steve says he expects to be in Boston on June 23. Can't you make it about two weeks earlier, Steve, and come to the reunion on the 11th?

Two other items have come to hand. One is from Professor Locke '96, who says that Frank Bowdish is leaving Duluth to go to the University of Kansas, where he has been appointed professor of mining engineering. He expects to teach mineral dressing. Apparently, the mining school at Kansas is being expanded. Bernard Dale provides the second item. He spent 11 days this December at Stowe, Vt., in Smuggler's Notch, where he enjoyed a lot of skiing. He has recently joined the Pennsylvania Grade Crude Oil Association as a field production research engineer. He is located in Bradford, Pa.

We have a clipping from the Lawrence, Mass., Sun informing us that Majorie Marie Lenane's parents have announced her engagement to Chris Matthew. Majorie was graduated from the Fay School in Boston, and as you probably know, Chris is with Arthur D. Little in Cambridge. From East Orange comes news that William Seitz, Jr., and Ann Cleveland Driggs are engaged. Bill did part of his undergraduate work at Kenyon College, Ohio, and later was with the Federal Telephone and Radio Corporation. At present he is back at school again at Bexley Hall, Gambier, Ohio, preparing for the Episcopal ministry. Mr. and Mrs. Wallace M. Ross have announced the engagement of their daughter, Ruth, to Bob Reebie. Ruth was graduated from Colby in 1944, and Bob, after discharge from the Army Air Forces, has been working on a B.S. in Business Administration at M.I.T. His graduation and the wedding were planned for February. We have news also that Edward Kane and Doris Norman Peterson of Waukegan, Ill., are engaged. The bride is a graduate of Mount Holyoke College; the groom did his undergraduate work at Union College and came to Tech for his doctorate in Chemistry. Both are now with du Pont in Wilmington, Del.

The wedding of Art Perlmuter and the former Ruth Jacobs took place on December 25 in New York at the Starlight Roof in the Waldorf-Astoria. The bride is a student at New York University. This couple spent their honeymoon in Havana, Cuba. Nancy Drew and Benjamin C. Muzzey were married in Dedham, Mass. The wedding was held in Nancy's home on January 12. The Muzzneys went to New Hampshire on their wedding trip and will make their home in Franconia. Nancy is a graduate of Smith College. February 11 was the day and Murfreesboro, Tenn., the place for the wedding of Jim Spitz and the former Elizabeth Parks, who is a graduate of the Moore Institute in Philadelphia. This couple will be at home in Oakdale, La.

Ray Richards and Tom Dyer both say they'll be in Cambridge on June 11, and waiting for the 1943 fifth reunion dinner. How about it? Will you be there too? — CLINTON C. KEMP, General Secretary, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

1944

A letter from Dave Jealous tells of his activities at Schenectady, N.Y., with General Electric. He is in the test lab along with Will Rodeman. Paul Heilman has recently transferred to Bloomfield, N.J., with G.E. Bruce Benepe is with the Leacock and Company, Inc., in New York City. Tom Carmody is also in New York with the Carbide and Carbon Chemical Corporation. Ted Gawain is in Trenton, N.J., with the De Laval Steam Turbine Company.

Bob Wood married Alison Carr on February 7, in Ossining, N.Y. Bob was graduated from Tech last February in Civil Engineering. Jay Kogan is engaged to Rita Cohn of Detroit. She is a graduate of the University of Wisconsin and a member of the Phi Sigma Sigma Sorority. Ben Goldberg of Brookline, Mass., is engaged to Shirley Weinberger of Dorchester. She attended Northeastern Law School and is a member of the Massachusetts bar. During the war Shirley was with the WAVES for two years. Ben was overseas as an officer with the Infantry. Alan Rose is to marry Elizabeth Zentgraf, a graduate of New Jersey State Teachers College, Upper Montclair, N.J. Alan is a member of Theta Chi Fraternity and is employed by the Cross Company of Detroit. He served two and a half years in the Signal Corps in the European theater. John Hoopes has married Marjorie Twombly of Wilmington, Del. Marjorie is a graduate of Simmons College. John did graduate work at Technology and Columbia and is now an instructor in chemical engineering at Columbia.

Wendell Peacock of Salt Lake City, Utah, who received his Ph.D. degree in Physics, is featured at some length in an illustrated article, "Business in Isotopes," published in the December issue of *Fortune*. He is a specialist in combining radioactive isotopes with drugs and other chemicals so that they may be used as tracers in studying diseases and possibly in developing new industrial controls. Dr. Peacock is working for the Clinton laboratories at Oak Ridge, Tenn.

The latest addresses show Ed Chapin to be in Cleveland, Ohio; John Chisholm on the staff at Tech; Dick Cotchett, in Menlo Park, Calif.; Nicholas Grant on the staff at Tech; Jerauld Johnson, in North Hollywood, Calif.; Ben Pritchard, at the University of Michigan, Ann Arbor; George Rosenblatt, in San Francisco, Calif.; Bill Stewart, U.S.S. Wisconsin, in care of Fleet Post Office, San Francisco, Calif.; and Harry Turner, in Baltimore, Md. — WILLIAM B. SCOTT, General Secretary, Mellon Hall C-41, Harvard Business School, Boston 63, Mass. MALCOLM G. KISPERT, Assistant Secretary, M.I.T., Room 3-243, Cambridge 39, Mass.

1947

It gives me great pleasure to convey the news to all of you that two of our classmates are now eligible for the "blessed event" department. The honor of being first to win the diaper sweepstakes goes to Jim Phillips, whose wife, Janie, gave birth to a son on Monday, December 1. I bumped into Jim at the annual banquet of *The Tech* early in January, which he attended in his official capacity of assistant to the Dean of Students; and he looked every inch the proud papa. He informed me that his offspring was christened James Lee, Jr., and that both mother and child were fine. Jim and Janie are living at 13 Westgate.

Pete and Bobbye Portmann followed the Phillipses by 13 days. Upon returning from the Christmas recess, I received a birth announcement from Pete, bearing the glad tidings that Bruce Martin was born on Sunday, December 14. A letter followed shortly after, from which I quote: "Things have been keeping both Bobbye and me pretty busy. The new young man is a lot of fun, but he needs plenty of attention. . . . Bobbye says he looks like me — pity the poor little guy — to be born looking like a Tech man. . . . Just to let you know what goes on with us down here I will give you a quick résumé. I am working for the Navy at the Research Lab here in Washington and am connected with Dr. VanAtta's group, which is doing antenna research. Van was formerly on the Physics staff at Tech and is one swell egg to work for. . . . As a side line, I am doing some graduate work at the University of Maryland and hope someday to get an M.A. in mathematics. . . ." Many of you will remember Mrs. Portmann — Bobbye — as the friendly young lady who was so helpful to us with our "Technique" biographies, last year. The Portmanns' address is 4706 Nichols Avenue, Southwest, Washington 20, D.C.

After my inquiries, Pete was kind enough to supply some information on the whereabouts and doings of Johnny Contegni and continues in his letter: "Johnny went to work for a large construction company after he left Tech. . . . was just recently transferred here by his company. He tells me he is planning to take some courses at one of the local universities next semester."

Burt Kahn was also at *The Tech's* dinner sponging a free meal along with your Secretary. He had just returned from a few months out in the field at the Bangor, Parlin, and Buffalo stations of the School of Chemical Engineering Practice and was back in the fold for a month's design course and his thesis. Others who are with him are Rudy Carl, Hank Sandler, Norm Greenman, George Sweeney, and John Kellett.

Three of our Boston classmates — Hal Brown, Len Croan, and Hal Simmons — are now employed by John Deere and Company, of Moline, Ill. Hal Brown and Len are with the metallurgical staff; Hal Simmons is concerned with foundry engineering and metallurgy. Two other metallurgists, Bob Kamm and Bernard Cullity, have accepted teaching positions at opposite ends of the globe. Bob is now in Australia as a senior lecturer in physical metallurgy at Melbourne University, while Bernard is engaged in research in physical metallurgy at the Centre de Recherches Metallurgiques of the Ecole des Mines in Paris. Bob Danner has a position with the United Shoe Machinery Corporation and is living in Beverly.

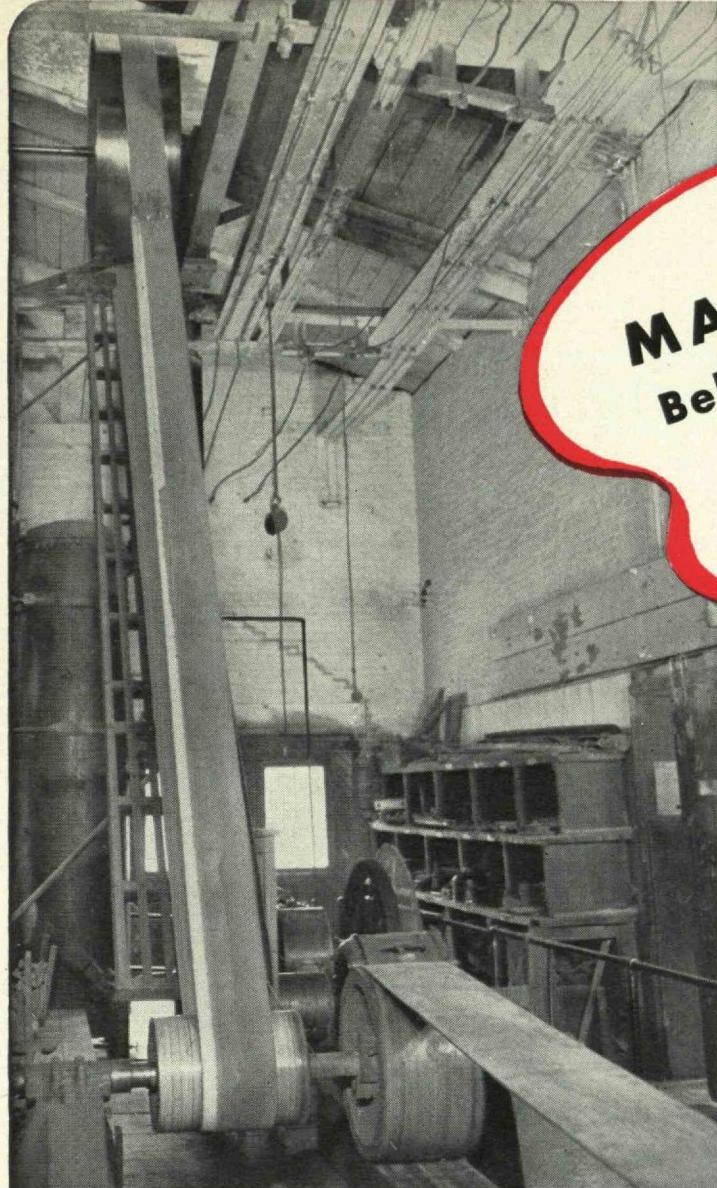
Engagement announcements are down to a bare trickle, but I'm happy to report those I've received. Len Harris, now an executive of the American Steam Laundry, will wed Nancy Jane Cohn of South Orange, N.J., in June. The engagement of Judith Rosenbaum of West Hartford, Conn., to Hal Brodsky was announced not long ago. Hal is at present employed as a metallurgical engineer with the Fafnir Bearing Company of New Britain. Two of our fellow students in the Aeronautical Engineering graduate department are planning June marriages. Bob Stevenson is engaged to Barbara Miller of Wakefield, Mass., and plans to return to active duty with the U.S. Air Forces upon receipt of his degree in June. Ginny Ferguson has accepted Bob Hildebrand's ring and spent the Christmas vacation with Bob and his family in Wilmette, Ill. Early in January, Ginny's parents gave her a surprise party at their Lexington home, which I attended together with Jack Kiefer, Hilde's old Tech Show crone, to give what moral support we could to the lucky man.

Jack Rizika, back at the Institute after a session up at Harvard, wanted one and all to know of the marriage of his good friend, Gabby Ploen, which took place some time ago. Jack supplied me with the complete newspaper account of the event from the Milton Record, to be sure that I'd have all the facts straight. Gabby wed Margaret Josephine Scholtes of Milton last October and is now back at Technology working as a research chemist for the Division of Industrial Coöperation. The newlyweds are living at 1089 Beacon Street in Boston.

As always, I shall be most happy to receive letters from any of you and to relay the good word to our classmates; so, how about it? — CLAUDE W. BRENNER, General Secretary, The Graduate House, M.I.T., Cambridge 39, Mass.

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